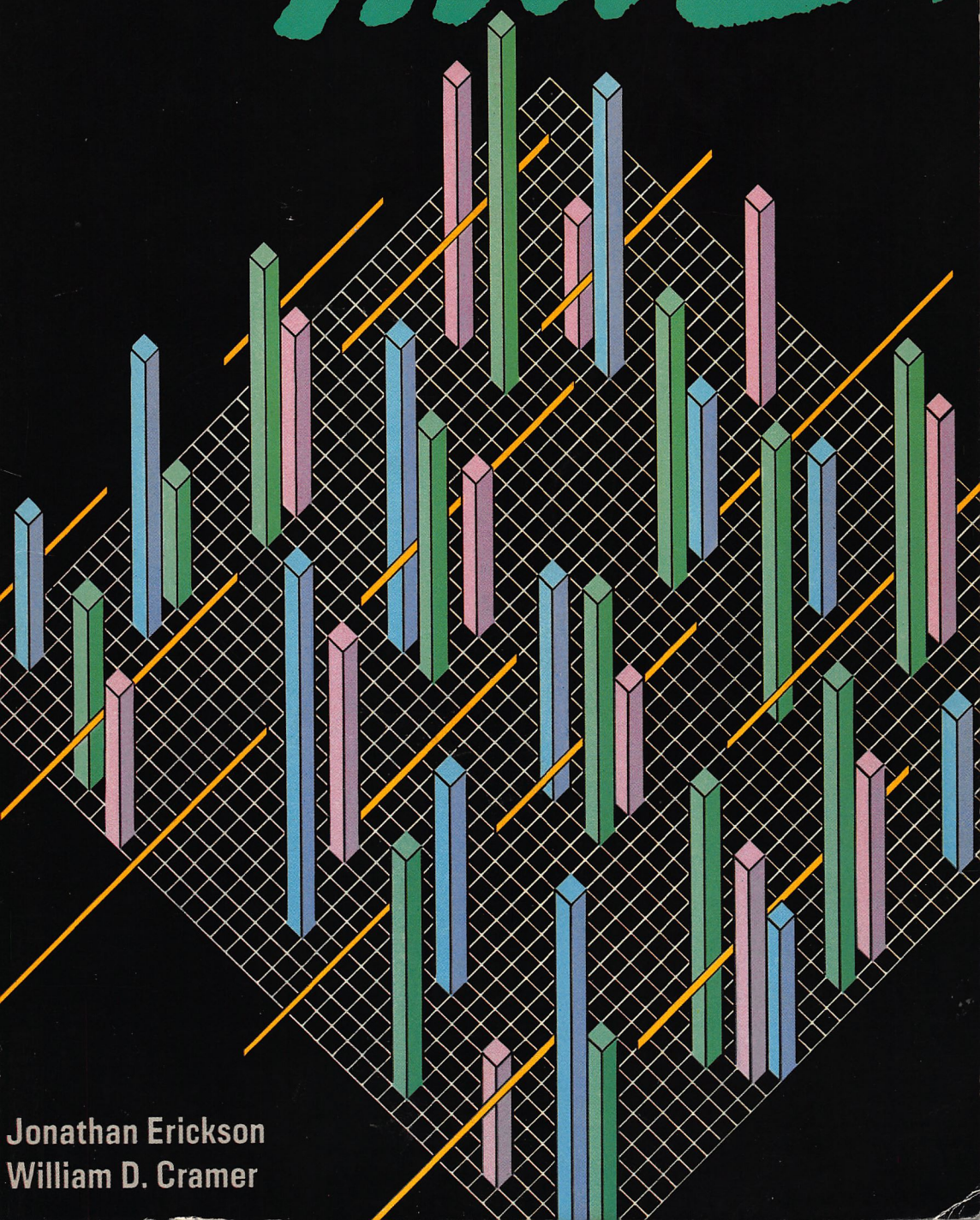


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MacTelecommunications



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MACTELECOMMUNICATIONS

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CONCLUSION

The purpose of this appendix is to introduce you to some of the issues programmers and engineers must consider when designing telecommunications software and hardware. For additional information on the concepts presented here, you might also refer to *Data Communications for Microcomputers* by Elizabeth Nichols, Joseph Nichols, and Keith Musson (McGraw-Hill, 1982) and to *Computer Organization* by V. Carl Hamacher, Zvonko Vranesic, and Safwat Zaky (McGraw-Hill, 1978).

how are you? I'm fine" sort of greeting. We discussed these lines in general terms earlier when we talked about "device ready" lines and CSR bits.

The connector for these ports has nine pins, hence nine lines. Two of these lines (lines 1 and 3) are dedicated for "cold" or "frame" ground. This is to prevent any power spikes on either end of the link from finding their way into the communications circuitry.

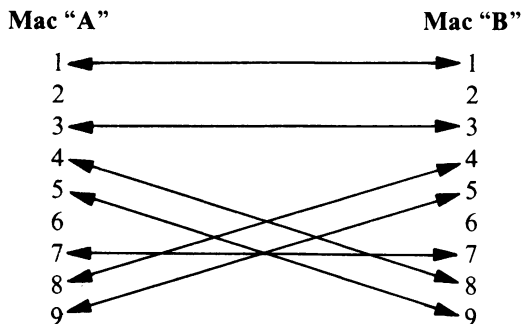
Two more lines have power on them; line 2 has +5 volts and line 6 has +12 volts. These lines are not for actually powering some peripheral and have no apparent function. As a guess, they probably can be used as "on" or "true" lines when needed.

Line 4 is the transmit line and line 5 is its ground. Line 8 is the receive line and line 9 is its ground. This leaves us with line 7. This line is referred to as the "handshake" line and is connected to two different circuits inside the Macintosh serial port. It can function as an input from the clear-to-send signal from the peripheral, or it can also function as the clock signal for synchronous links.

Chapter 2 describes which lines go where. Knowing where the lines go is useful if you need to "build" your own cable for connection to non-Apple peripherals (a Hayes SmartModem 1200 instead of an Apple Modem 1200, for example).

If you connect two Macintoshes to each other directly, you'll find that they both try to speak over the same line and both try to listen over the same line. Consequently, communication cannot occur. To remedy this situation, remember that one end of the serial link must listen to the same line that the other end of the link is speaking on. A "null modem" flips the receive and transmit lines so you can connect two Macintoshes and communicate between them. To make a null modem, make the following connections:

Line Connections for a Macintosh-to-Macintosh Null Modem



Note that to construct this null modem, you do not have use lines 2 or 6.

Ports implementing these standards, “Recommended Standard #232 Revision C” and “Recommended Standard #422 Revision A” (or simply RS-232C and RS-422A), are present in some form on virtually every microcomputer sold today, either as part of the basic hardware package or as an option. The standards describe a number of control lines, the voltage requirements on these control lines, the type of circuits which make up the device controllers, and the physical attributes of the connector plugs.

While RS-232C has 25 lines in its full implementation, and RS-422 has 46 lines in its full implementation, you may have noted that the serial port on your Macintosh has only nine lines. The Mac ports are based on the RS-422A standard, a variation of the original RS-422 standard. However, the Macintosh port includes all of the lines you’ll come across in normal operation. The lines left out have special uses, including modem control and backup data and control lines.

As you may or may not know, a voltage level is actually a “potential difference” between two levels. That is, to describe the voltage on a wire, we actually describe the difference between what’s on the wire and what we define as zero volts (or the “ground voltage”). Hence, in addition to the data and control lines on our serial link, we must also include one or more lines which show the ground voltage for those lines.

On both RS-232C and RS-422A, we define a voltage less than zero (relative to the ground) as a binary 1 (false) condition. Likewise, a positive voltage difference indicates a binary 0 (true) condition. The actual voltages for the two standards differ slightly. For RS-232C, +3v to +12v is a 0 and -3v to -12v is a binary 1. For RS-422A, +2v to +6v is 0, -2v to -6v is 1. However, the circuitry is forgiving; most RS-232C peripherals will work just fine on your Macintosh’s RS-422A ports. The following table sums up the different nomenclatures of the two voltage levels.

Voltage	Binary value	Logic state	Mark space	On/off
positive	0	true	space	on
negative	1	false	mark	off

A “bare bones” RS-232C line consists of a transmit line, a receive line, and a common ground line. A bare bones RS-422A line, however, uses two ground lines: one for the transmit line and another for the receive line. This use of two lines, or “wrapped pairs,” per direction, helps give RS-422A its superior characteristics; namely, higher speed and greater cabling length. A basic RS-422A cable then uses at least four lines.

Just as the internal bus uses control lines as well as data and address lines, an RS-232C or RS-422A port also uses control lines. The control lines let the computer know when the peripheral is ready, and vice versa. Such control lines are called “handshake” lines, because in electrical terms, their function is like a “Hello,

Byte	Odd parity	Even parity
00000000	1	0
10000001	1	0
10001001	0	1
11111111	1	0

If some electrical “noise” infiltrates the data line, the noise may change a 0 to a 1 or vice versa. The transmitter will be unaware of the error and will send the parity bit as it sees fit. Hence, if the transmitter sends 00010001 under even parity, it will append a 0 parity bit. If in the transmission this changes to 0001000, the receiver will expect a parity bit of 1. Finding a 0 parity bit tells the receiver to set a flag in the status register so that the software in the device driver can take some appropriate action.

This scheme isn’t completely foolproof; if two bits get garbled, the parity bit may still be correct. For example, if the transmitter sends 00010001 but the message changes into 00010010, the receiver will not recognize any problem with the parity bit.

Another type of asynchronous communications error is called a “framing” error. Such an error occurs when the number of bits in between the start and stop bits is different from the expected total. This type of error occurs most commonly when you have supplied the software with the wrong information about the number of bits per byte. However, this error can also occur if a sporadic power “spike” gets onto the data line and makes the device controller think that it has received a start bit.

Error detection is a science in its own right. Many studies have been made showing the relationships between errors and encoding schemes, transmission distances, and transmission media. Some very elaborate schemes have even been designed which can correct for errors through use of multiple parity bits. However, for our concerns (talking to CompuServe or getting the latest Dow Jones figures), the errors should be infrequent enough that we can manually request retransmission of the data, or even choose to ignore the error.

RS-232C Versus RS-422A

Several years ago, when telecommunication was in its infancy, those engineers at the forefront of the technology recognized the need for a standard means of connecting two computers through a serial link. In 1969, the Electronics Industry Association (EIA) came up with a “recommended standard” for communication that has since become popular for both mainframe computers and microcomputers. In 1977, to keep up with the changing hardware and software needs, EIA updated this standard.

Asynchronous Communications

The majority of applications that you'll use are "character oriented" rather than "block oriented." By character oriented, we mean that the communications software looks at individual characters rather than blocks of data. When using CompuServe, for example, you'll find yourself typing in a single character for a menu selection. CompuServe will respond with a string of characters, and so on.

Since each transmission of data can be divided into individual characters with no particular concern about the order (other than obvious sentence context) or when the next character is sent, this type of communications is called "asynchronous."

Asynchronous devices must have some means of synchronizing data transfers between the transmitting and receiving computers. Asynchronous devices use what's called "framing bits," or more specifically, "start" and "stop" bits.

When an asynchronous communications line is idle (no data transmissions occurring), the transmitting device loads the data line with constant binary 1's. This condition is called "marking." When a device wants to begin sending a character, it toggles the data line to binary 0 and starts an internal clock. This binary 0 condition is called a "space," and this initial space a "start bit."

When the receiving device (typically another computer) senses the change in the data line, it too starts an internal clock. After an appropriate delay (dependent on the baud rate), the transmitting computer begins sending bits of data. The receiver, using its own clock (already synchronized with the transmitter since the start bit), looks at the data line every so often (also dependent on the baud rate) and moves bits into the input buffer.

The asynchronous controller counts the number of bits that it has received or sent and compares this to the pre-agreed upon value. When the transmitter has sent the required number of bits, it may then send a "parity" bit, which we will discuss shortly. It then sends one or more "stop bits." Like the start bit, stop bits are spaces, or zeros on the data line. After the stop bit(s), the transmitter returns the data line to the marking state.

The asynchronous device controller uses the parity bit for detecting errors. The parity bit represents an arithmetic characteristic of the data and is included in the calculation. As the transmitting computer sends out bits, it adds the value of the bit to the sum of those already sent. When the time comes to send the parity bit, the computer sends out a 0 or a 1 based on this accumulation.

Parity can be "odd" or "even." If odd parity is used and the sum of the bits is even, then the transmitter sends out a parity bit of 1 so that the total accumulation of bits is odd. If the total is odd, then the transmitter sends out a 0 parity bit. Just the opposite is true for even parity: the total for the bits transmitted should end up an even number.

For example, say that your Macintosh is sending out 8 bits of data per byte. The following bytes would result in the indicated parity bit for odd and even parity schemes.

device to your Macintosh is a special cable like that shown in Figure 2-3. A variety of peripherals are available which connect to your RS-232C port, including joysticks, mice, modems, printers, plotters, digitizers, remote terminals, and so on.

- Since data moves one bit at a time, serial devices let you define the number of bits in each data group. Since ASCII codes use only seven bits per byte, you can choose to send text files using only seven bits per byte. The fewer bits sent per byte, the faster you can send the bytes.

Serial communications isn't without its disadvantages, however. The fact that the data transfer is on a bit-by-bit basis means a byte transferred serially may take eight times as long as if it were transferred in parallel.

A second disadvantage of serial communications is that it requires a stricter timing protocol than does parallel. In serial communications, the device controller must transmit consecutive bits at a specific rate of transfer. This factor naturally requires that both ends of the communications link agree on the rate of transfer.

Internally, the Macintosh bus thinks in terms of parallel data transfers. Consequently, the serial device controller must be able to convert the parallel data to serial. It does so by the use of a "shift register." A shift register essentially lets the controller access a byte one bit at a time. It works by moving, or "shifting," each bit one bit space to the right or left. If the register is shifting to the right, it fills in zeros from the left; if to the left, then it fills in zeros on the right.

Naturally, each shift forces one bit out of the register on one end or the other. It is this bit that is sent down the communications line. When the device controller decides that it is time to send another bit, it shifts the register once more and forces the next bit out of the register and onto the line. On the other end of the serial link, another shift register works in reverse, moving the new bits in and shifting out zeroes.

This shifting of bits out onto the communications line must occur at precise time intervals so that the receiver expects the data at the same time the transmitter puts it onto the line. Thus, controlling the rate of transfer (that is, the baud rate) is of vital importance. Each end of the communications link must then agree on the baud rate. Agreeing on the time between consecutive bits isn't quite enough, however. For example, one end could be sending data on the millisecond (that is, at times 1ms, 2ms, 3ms, and so forth), while the receiver could be sampling the data line on the half millisecond (that is, at times 1.5ms, 2.5ms, 3.5ms, and so forth). Clearly, there must be some standard way to "synchronize" the receiver to the transmitter.

There are two methods of synchronizing the two ends of the link, the "asynchronous" method and the "synchronous" method. Since almost everything you'll want to connect to your Macintosh uses the asynchronous method, it will be discussed in detail.

In other computers (generally minicomputers and mainframe computers), parallel devices often handle local communications between one computer and another. Some applications may involve so-called “dual processing” where one computer handles one part of the job and another computer handles another part of the job. Naturally they both need to know what the other is doing, and the fastest way to communicate (other than direct bus connection) is through a parallel link. In such a system, both computers “talk” and “listen”; this bidirectional data flow is called “duplex.”

Parallel data transfer on microcomputers usually involves moving 8 bits at a time. The cable for such a parallel link has 8 lines for each direction of data transfer (that is, either 8 lines for a simplex connection or else 16 lines for a duplex connection). In addition, the link must include certain control lines which indicate when a device can accept new data or when a device has sent new data down the line.

Unlike many microcomputers, the Macintosh does not have a parallel port. Instead, it has two “serial” ports where data flow involves sending a series of bits down a cable, one bit at a time. One of the Macintosh’s serial ports is designed primarily for a modem and the other for a serial printer, like the Imagewriter. This is a safe move, since most printers are capable of both forms of communication, and eliminating the port on the Macintosh saves internal space as well as cost.

There are several advantages to serial communications as opposed to parallel communications.

- Since only one bit is transferred at time, there isn’t the need for as many connecting wires between the two devices. In fact, on some of the simplest serial setups, only two or three wires may be needed.
- A serial “stream” of bits is simpler to “modulate” and “demodulate” with a modem.
- Since only one bit travels at a time, you needn’t worry about a “skewing” problem. Skewing occurs in parallel data transfers when, over a distance, one or more signals reach the other end ahead of or behind the other signals. This may make the other end’s controller think that it has a complete message even though only part of the data has arrived. This limits the distance of a parallel link in which there is no skewing to perhaps only 50 feet. Since serial links send only one bit of data at a time, there is no skewing problem, and it isn’t unusual to see several hundred feet separating the two ends of a serial communications wire.
- There is an almost worldwide accepted standard for serial communications, called RS-232C. Most microcomputers built today claim at least one RS-232C compatible port as standard equipment. Your Macintosh uses an updated standard called RS-422A. RS-422A is compatible with RS-232C peripherals; in general, all that is needed to connect an RS-232C

Your driver program has access to the device CSR, and it too can tell the device to stop sending the device ready signal. Once your main line program has had a chance to retrieve the data from the input buffer, the driver program can resume sending the device ready signal to the other end of the link. The driver may look like this:

```

pointer = start of buffer
enable initial read and read interrupt
while data input is required
    wait for data ready bit
    move data from input register to buffer
    update pointer
    while buffer full
        wait for mainline code to free up buffer space
    end while
    enable next read (resume device ready signal)
end while
disable read

```

Another way of stopping and resuming data flow is through the use of special data bytes sent between devices. If a receiver routine senses that its buffer is full, it can send an XOFF (transmitter off) command to the other device to request that it stop transmitting. When the receiver senses that its buffer has free space, it sends an XON (transmitter on) command to the other device which tells it to resume the flow of data. XON and XOFF are special ASCII control codes (usually decimal 17 and 19, respectively). Most devices, as well as device driver software, have options which enable or disable XON and XOFF functions.

DATA TRANSFER

Now that you have been introduced to the hardware and software involved in getting information in and out of the microprocessor, a discussion of the formats which input/output can take is needed. The first format we'll discuss is "parallel" data transfer.

As the name implies, parallel data transfer involves moving several bits of data side by side. One type of parallel transfer form, the internal data bus, has already been discussed. Recall that on the data bus, 16 bits (one word) simultaneously move between two locations within the computer (for example, between the CPU registers and memory).

Microcomputers generally use parallel device controllers for sending data to a similarly ported parallel printer. In this mode, the computer does all of the "talking" and the printer does all of the "listening." Such a one-way flow of information is called "simplex."

```

while data remains to be written
    wait for device ready bit
    move data at buffer(pointer) to output register
    enable new write
    update pointer
end while
disable write interrupt

```

The “wait for” step in the while loop means that the CPU goes back to executing main line code until the device becomes ready and sends an interrupt. When the interrupt comes in, the driver code resumes at the next step of the routine.

Inputting data is a little different than outputting data, since you may or may not know beforehand how many bytes should be read. If you know how much data is coming in, programming is straightforward:

```

pointer = start of buffer
enable initial read and read interrupt
while data remains to be read
    wait for data ready bit
    move data from input register to buffer(pointer)
    update pointer
    enable new read
end while
disable read

```

However, if you do not know beforehand how much data to read in, you must make a few provisions. Generally, you move input data from the peripheral into a temporary buffer within the operating system. As you accumulate data, you send out messages to programs in the system to tell them that you have freshly input data. In theory, these programs can come into your temporary buffer and remove the data before the buffer fills up. In reality, however, what often happens is that the buffer fills up before a program can remove data from the buffer.

If your driver program was not very intelligent, it might continue to accept data, writing the new data on top of the old data, even though no program had yet read it. Or, it might write the new data on top of something else stored in adjacent memory. Neither situation is healthy, so the driver code must be “smart” enough to tell the other end of the link to stop sending data.

How does a driver do this? When a device controller reads a new piece of data, it temporarily stops sending the device ready signal to the other end of the link. Sensing this, the device on the other end of the link knows not to send another piece of data right away. Meanwhile, the interrupt code reads the input buffer, takes appropriate action on the data (usually by storing it into a buffer), and then resets the device ready bit (either manually or automatically) so that the transmitter can resume sending data.

main line code, the CPU first jumps to the keyboard driver routine and then back to the main line code.

Direct Memory Access

Another type of device controller is called “direct memory access,” or “DMA.” DMA controllers allow a program to initiate an input or output and then continue with the data transfer without further intervention from the CPU.

For example, many disk controllers have a DMA mode. Disk drive accesses are always made to input or output a fairly large block of data. Your program tells the controller how many bytes to read, from where on the disk, and the address of the memory buffer where the data should go. Then the controller takes over: as it inputs bytes, it stores them into the buffer as directed by the original program command, updates the pointer into the buffer, and decreases the number of bytes left to read.

Note that this process does not include generating an interrupt and does not require CPU intervention. When the device has read all of the bytes requested, it then generates the interrupt to the CPU to let the operating system know that it has completed. The implications of this should be clear; if the controller can handle data on a byte-by-byte basis without interrupting the CPU, it follows that the CPU can perform more work than if it were interrupted for each byte transfer.

The DMA is feasible only for certain types of controllers: those that typically deal in block transfers of data. For example, DMA would be useless for keyboard input, since a program generally doesn’t know how many keys its user is going to press in any given situation.

Peripheral Device Drivers

Device drivers, accessing controller registers, and assigning interrupt vectors, especially for DMA devices, can become very complicated. For example, some device controllers may have as many as 10 registers for control, input, and output, and may have an instruction set comparable to the microprocessor itself.

Fortunately, the Macintosh incorporates the appropriate driver routines to easily handle the device controllers. In addition, routines are resident in memory so that applications programs like MacTerminal can interface with driver routines without major problems.

Generally, you send data in and out of your Macintosh through “buffers.” Buffers are temporary strings in memory that are accessed by the device driver programs. A typical device driver for outputting data may go as follows:

```
pointer = start of buffer
enable initial write and write interrupt
```

Many times in program design, you come to a point in the program where you must select what to do next. A convenient way to do this is to use a “call table.” The call table contains the starting address of subroutines for each of the possible selections. By using some special addressing modes, we can offset into the table and call the appropriate subroutine.

The Macintosh maintains such a table, called the “interrupt vector table,” in the low addresses of memory. Each device (video, communications port, and so on) has an associated vector, sometimes two, one for input interrupts and another for output interrupts. A program loads the addresses of the device driver routines into this call table, along with the processor status word for the device.

When a device controller signals the CPU that it wants to interrupt the current routine, the CPU pushes the current program counter and processor status word onto the system stack. The device controller then tells the CPU what vector to use to begin the interrupt service routine. The CPU then jumps to the routine indicated by the vector contents and loads up the new processor status word.

The device driver then performs any necessary processing, for example, by moving incoming data from the controller’s input register to a more long-term buffer in the Macintosh’s memory. When it has completed all it must do, it issues a “return from interrupt” command, which tells the CPU to pop the program counter and processor status word from the stack and begin executing the main line code where it left off.

The CPU saves the processor status word because it contains the running “priority level” of the CPU. The priority level can be from 0 to 7; normal program code operates at level 0. However, device drivers normally operate at a higher level, depending on the particular device. The priority level is important when discussing interrupts because it determines who can interrupt whom. For example, you may press a key on the keyboard. The device interrupts, vectors to the driver routine, and raises the priority level to, say, level 5.

Perhaps while the driver routine is still executing, another device, such as the disk drive, interrupts. The data flow from the disk drive is quite “time dependent”; that is, if the computer doesn’t get to it fast enough, it will lose the data. It may be a priority level 6 device. The CPU “arbitrates” between devices and picks the one with the higher priority (in this case, the disk drive).

So that it doesn’t forget the keyboard routine completely, before jumping to the disk driver code, the CPU pushes the current program counter (which is somewhere within the keyboard driver code) and the processor status word. When the disk routine completes, it pops the stack and completes the keyboard routine. When the keyboard routine completes, it pops the stack again and returns to the original code.

If the CPU is executing a high priority level interrupt routine (for example, the real time clock) when you press a key, the CPU compares the clock and keyboard priority levels and finds that the clock has a higher priority. In this case, the CPU would continue to execute the clock routine. Upon completion, it would then try to return to the main line code. However, since the keyboard controller has been patiently holding up its hand to interrupt the CPU, instead of returning to the

Interrupts

An alternative method for controlling input and output makes use of “interrupts.” An interrupt, as the name implies, breaks into the normal flow of a program whenever a status change occurs in a device controller’s CSR. A special piece of program code, called a “driver routine,” or “interrupt handler,” processes the condition, for example, by moving data to memory for an input, by moving more data into the output buffer for an output, or by flashing a message on the screen telling you of some error condition on the device. When the driver has completed the processing, the previously running code begins from where it was interrupted.

Obviously, using interrupts requires a bit more forethought on the part of the person writing the program than does using polling for input and output. To use interrupts, your program must let the device controller know that it should interrupt the CPU when it changes status. Two CSR bits, “read interrupt enable” and “write interrupt enable,” define whether or not the controller will interrupt.

What happens when a device interrupts the CPU? Since the CPU is executing your program relatively independently of the device, the interrupt could occur at any point in the code. The CPU must somehow remember where it is (that is, the address contained in its program counter) as well as its running status (the processor status word). It then must have some means of recognizing which device controller interrupted it and where the appropriate driver routine is located in memory.

To understand how interrupts work, you first need to be familiar with two special structures: “stacks” and “call tables.” You may think of a stack literally as a stack of, say, dishes. When you put a new dish onto the stack, it goes onto the top of the stack. A new dish then would go on top of the dish just added. When you remove dishes, you must start at the top of the stack and move down. Programmers refer to a stack as “last in, first out,” or “LIFO,” because the last item added (or “pushed”) to the stack is the first item removed (or “popped”) from the stack. Likewise, the first item added to the stack will be the last item to be removed.

The 68000 implements the system stack by allocating a chunk of memory as the stack, and using an address register called the stack pointer, which contains the memory address of the “top” of the stack. An assembly language program can manually push data to the stack by moving the stack pointer to a memory address just above the current top of the stack and then storing data at that address. It can pop the data off of the stack by reading the data at the address pointed to by the stack pointer and then moving the stack pointer back one memory slot.

The CPU also uses the stack to make “subroutine” calls. As its name implies, a subroutine is a routine subordinate to another routine (either the main routine or else another subroutine). Whenever a program calls a subroutine, the CPU automatically pushes the address of the code currently executing and then begins executing in the subroutine. At the end of the subroutine, the program issues a “return” command which tells the CPU to pop the address off of the stack and begin executing at that address.

some command to the controller by setting a bit, and then later read that bit to verify that it gave the command.

Naturally, a program must tell the controller what to send out to a peripheral. The controller may have a register called an “output register” where the program writes its data. Similarly, the controller must have a means of giving data (from the keyboard, for example) to the computer. It uses another register called an “input register” to accomplish this.

In order for a program to accept data from a peripheral, it must first set a certain bit in the CSR so that the controller knows to allow data into its input buffer. This control bit is often referred to as the “read enable” bit. Once the program has set the read enable bit, it must wait for the peripheral to send data to the controller. When it does, the controller sets a certain bit in the CSR, which indicates that the peripheral has sent data to the computer and that the controller has finished converting it into a readable format and has put it into the input register. This bit is often referred to as the “data ready” bit. Once this bit is set, the program can read the data from the input register.

To write data to a peripheral, the program must first wait for a CSR bit, commonly called the “device ready” bit, to be set. This bit indicates that the peripheral is ready to receive data. When this is true, the program moves a piece of data into the output register. In some device controllers, this action sends the data out to the peripheral. In other controllers, the program must set a “write enable” bit in the CSR in order for the data to exit the controller.

Polling

How does a program like MacTerminal know when to expect the data ready and device ready bits? One method for this is for the program to periodically check the CSR to see if there are any changes. The program may stay in a “tight loop” by continuously checking the data and device ready bits and doing nothing else. Alternatively, the program may execute some other functions and periodically come back to check the CSR for new status.

This method of manually checking the CSR for changes is called “polling.” It is useful when the program needs to do only one thing at a time. For example, your program may print out a prompt on the video screen and wait for a response. For this application, polling is ideal, since the computer would have nothing else to do except wait for the input.

At other times, this method can be quite unacceptable. For example, your program may be printing out a long report. You want to give the program the capability to stop printing if need be (for example, to change paper). With the polling method, the program would need to check the data ready bit of the keyboard controller and the device ready bit of the printer after printing each character. Clearly, the program could take nearly twice as long to execute because of this procedure.

PERIPHERAL DEVICES

The CPU and memory can work quite well on their own, crunching numbers and solving the problems. However, unless they have some means of accepting new data and displaying the results of their work, they don't perform a useful function. This is where "peripheral devices" come into play. A peripheral device can be anything that accepts, generates, or displays data. Examples include the video screen, the keyboard, the mouse, the printer, and the point of this book, the communications ports (connectors) to which you connect a modem.

The voltages within the CPU and memory and along the bus are all specially matched. That is, all system components within the Macintosh "agree" on what electrical values constitute a binary 1 and what values constitute a binary 0. (See Chapter 2 for background on positive and negative electrical value in relation to binary values.) The exact values depend upon the "family" of integrated circuits that make up the computer cards. The term "family" refers to the manufacturing design used to make the computer chips. For our requirements in this discussion, suffice it to say that each family has a different set of electrical specifications for defining true and false.

Although the voltages within the computer all match, the voltages between peripheral devices (such as printers and terminals) and the computer generally do not match. Modems, printers, and terminals are generally sold as options separate from the computer itself. Hence, they must be compatible with all families of integrated circuits. In addition, such peripherals must be capable of working some distance from the computer. Most internal electrical formats are too weak to remain accurate beyond a few feet. Finally, peripherals can't display data nearly as fast as the computer can produce it.

This is where a special computer circuit called a "device controller" becomes necessary. A device controller converts the internal true and false voltages (0 and 1 in binary terms) into a standard level that is capable of traveling some distance. In addition, the device controller compensates for the differences in the operating speeds between computer and peripheral.

A controller generally has several registers (not to be confused with CPU registers) through which programs tell the controller what to do (send out data, read in data, and so on). In the 68000, these registers have memory addresses so that programs can access them just as they would data.

A typical controller has several registers. One of these registers has the duty of telling a program like MacTerminal the status of the device (ready to work, malfunctioning, and so on). A program also uses this register to give the controller commands (input some data, output some data, and so forth). Often this register is called a "control and status" register, or simply "CSR."

The individual bits of the CSR have special meanings. Some bits show controller status; these are called "read only" bits because they are made true or false by the controller and the program may only read their values. Other bits accept commands; these may be "write only" or "read/write" bits. The program may give

fetches the data stored at the memory address contained in the address register and then performs the operation. For example, address register 0 (A0) may contain the value 1000. The word at address 1000 contains the value 12345. A machine-level instruction may request that the data stored at the address pointed to by A0 be moved into data register 1 (D1).

Two of the address registers serve a special duty. One of them is called the “program counter.” It contains the memory address of the program instruction that is currently executing in the CPU. The other address register is called the “stack pointer.” Stacks are a special data structure that we will discuss later in this appendix.

Another register is the “processor status word” (PSW). It is neither a data register nor an address register. It functions rather as a “status” register and defines the status of the CPU. Describing it in detail is beyond the scope of this book; suffice it to say that it stores the CPU mode of operation, the status of several “flags” which work in conjunction with machine instructions, and the priority level of the program that the CPU is executing.

The Bus

The bus moves the data that is stored in memory and manipulated in the CPU from one place to another. The bus is basically a set of wires over which data, addresses, and electrical control pulses pass. The “address bus” and “data bus” are usually thought of as unique entities.

The address bus determines where data and instructions come and go in main memory. When the CPU wants to fetch some piece of data or a new program instruction from memory, it loads the address of the appropriate memory slot onto the address bus. The address bus of the 68000 is 24 bits wide. This means that there is a possibility of having a total of 2^{24} (16,777,216) different address slots (bytes) in memory.

The “data” bus transports data between the CPU and memory. When a program requests that the CPU move some data from a particular memory slot into a register, it moves the address onto the address bus. The internal logic of the memory then looks up that address and moves the data stored at that address onto the data bus. Finally, the internal logic of the CPU “opens” the gate between the register and the bus so that the value from memory ends up in the register.

The 68000 data bus is 16 bits wide. In this respect, the 68000 is a 16-bit microprocessor. However, the 68000 could manipulate data in groups of 8, 16, or 32 bits. This means that to fetch a byte (8 bits) from memory, the computer uses only half of the data bus, and to fetch a word (16 bits) from memory, it uses all of the lines on the data bus. To move a long word (32 bits) from memory into a register, it must fetch the first 16 bits, store them into half of the register, and then fetch the other 16 bits and store them into the other half of the register.

BASIC MACINTOSH ARCHITECTURE

There are three distinct portions of your Macintosh: the central processing unit (CPU), the main memory, and the controlling circuitry for the peripheral devices (for example, the video screen). Naturally, these portions must be physically connected; the connecting wires are called the “bus.”

Main Memory

Main memory is, as its name implies, the main storage place where the Macintosh “remembers” what it has done and what you have told it to do. Memory consists of many thousands of “slots” which can store data or program instructions. In order to manipulate individual pieces of data in the memory, each of these slots has an “address,” or numeric assignment, which distinguishes it from the other slots. The Macintosh is a “byte-addressable” computer in which each of the memory slots contains one byte of data.

You’ll often hear the terms ROM and RAM in conjunction with memory. RAM, or “rapid access memory,” is what you usually think of when discussing memory. It is “read/write”; that is, your programs can read information from it and store data into it. ROM, or “read only memory,” can only be read from by your programs. Many of the Macintosh’s internal system programs are stored in ROM. This ensures that they are always present inside the computer and needn’t be loaded from a diskette every time they are required.

The Central Processing Unit

The CPU is the workhorse of the computer. The CPU your Macintosh uses is the Motorola 68000 microprocessor. This is where the bulk of the number-crunching takes place. It consists of circuits that utilize Boolean logic to add, subtract, multiply, and divide numbers. Collectively, these circuits are called the “arithmetic logic unit,” or simply “ALU.”

Also within the CPU are several specialized temporary holding places called “registers.” There are two common types of registers: “data” registers and “address” registers. The 68000 has eight data registers and eight address registers. Both types of registers are 32 bits wide; hence they can hold numbers up to $2^{32} - 1$ (4,294,967,295). In this respect, the 68000 is considered a 32-bit microprocessor.

The data registers serve as temporary holding slots for arithmetic operations. Typically, a program such as MacTerminal will instruct the CPU to move a piece of data into a data register, run one or two values through the ALU (for example, to add or subtract), return the result back to the register, and finally move the register value into memory.

The address registers typically serve as “pointers” to data. Typically, the CPU

B

TECHNICAL OVERVIEW OF MACINTOSH TELECOMMUNICATIONS

A technical understanding of your Macintosh's internal operations isn't required to use your computer to communicate with other computers. However, being aware of a few of the basics can sometimes help you solve technical problems or provide a start for customizing some of your telecommunications needs.

This appendix begins where Chapters 2 and 3 left off. Those chapters described the fundamentals of communications hardware and software. If you remember, terms such as bits, parity, RS-422A, and XON/XOFF were introduced. This appendix discusses those concepts and others from a more technical level. We will start with a discussion of how data is transferred within the Macintosh itself, then describe how that data is sent to and from peripheral devices (modems, printers, and so on) via the communications ports on the back of the Macintosh.

If this is your first encounter with the technical side of computers, be sure to review Chapters 2 and 3 before beginning this appendix.

Interstate Commerce Commission

The ICC database offers information on the railway industry, including mileage traveled per car, types of cars and locomotives, earned income from freight and passenger trains, and so forth.

Federal Railroad Administration
400 Seventh Street, SW
Washington, DC 20590
Phone: 202-426-4000

MARDATA

MARDATA (short for “marine data”) keeps track of ship movement around the world. This database is useful for planning the most cost-effective international cargo shipments.

Maritime Data Network, Ltd.
102 Hamilton Avenue
Stamford, CT 06092
Phone: 203-327-6433

Scisearch

This scientific search service covers more than 4000 technical magazines in all scientific areas from around the world. The Institute for Scientific Information, the sponsor of Scisearch, maintains several science-related information services.

Institute for Scientific Information
3501 Market Street
Philadelphia, PA 19104
Phone: 215-386-0100

TRANSPORTATION INDUSTRY SERVICES

Information on virtually every facet of the transportation industry (automobiles, trucking, air travel, railroads, and so on) can be found in an on-line database.

Automotive News Data Bank

Market statistics can be reviewed and trends predicted with the information stored in the Automotive News database. Typical data includes production levels, inventories, and prices.

Crain Automotive Group, Inc.
965 East Jefferson
Detroit, MI 48207
Phone: 313-567-9520

POD

The POD (Passenger Origin Destination) database provides transit data—for example, the number of people flying on small airlines and the tonnage of freight carried on feeder airlines.

Civil Aeronautics Board
Information Management Branch
1825 Connecticut Avenue, NW
Washington, DC 20428
Phone: 202-673-5922

SCIENTIFIC SERVICES

Scientific databases provide information on a variety of subjects, such as medicine, chemistry, computers, and energy.

Chemsearch

Almost any substance can be identified through this chemical search database.

Chemical Abstracts Service, Inc.
P.O. Box 3012
Columbus, OH 43210
Phone: 614-421-3600

Critical Care Medicine Library

Some of the most recently published medical textbooks can be found on-line in the CCML database. BRS offers several science-oriented services (two are PRE-MED and PRE-PSYC).

BRS
1200 Route 7
Latham, NY 12110
Phone: 518-783-1161

Nuclear Energy Agency Data Bank

Information concerning the design and construction of nuclear reactors can be found in the Nuclear Energy Agency Data Bank (NEA Data Bank), which is sponsored by the U.S. Department of Energy.

Argonne National Laboratory
National Energy Software Center
9700 South Cass Avenue
Argonne, IL 60439
Phone: 312-972-7250

EDUCATIONAL SERVICES

These databases collect specialized information of interest to educators from journal abstracts and dissertations.

NICEM

NICEM (National Information Center for Educational Media) tells how to get audiovisual materials that are not widely publicized. Selections include films, filmstrips, slides, and records.

National Information Center for Educational Media
University of Southern California
Los Angeles, CA 90007
Phone: 213-743-6681

Resources in Vocational Education

The technical nature of most vocational-education courses requires up-to-date information. The Resources in Vocational Education (RIVE) database provides information of this type that is of particular value to educators.

The National Center for Research in Vocational Education
Ohio State University
1960 Kenny Road
Columbus, OH 54210
Phone: 614-486-3655

Exceptional Child Education Resources

Information that helps educators deal with exceptional children can be found in this database.

The Council for Exceptional Children
1920 Association Drive
Reston, VA 22091
Phone: 703-620-3660

BUSINESS SERVICES

Business-related databases cover a broad spectrum of topics, including industries, commodities, corporate history, and economics.

Cost Forecasting Data Banks

Long-range financial planning can be facilitated by the information stored in the Cost Forecasting Data Banks. This service provides data on various economic indicators, such as U.S. and European wages, inventories, and export and import quotas.

Data Resources, Inc.
Data Services
1750 K Street, NW, Suite 1060
Washington, DC 20006
Phone: 202-862-3760

Standard and Poor's General Information File

The Standard and Poor's database provides information on more than 3000 corporations offering public stock (corporate addresses, net worth, history, and so on).

Standard and Poor's Corporation
25 Broadway
New York, NY 10004
Phone: 212-208-8000

Trade and Industry Index

The T & I Index provides information on specific products and companies. Business topics range from building trades to tax laws.

Information Access Corporation
4040 Sixth Avenue
Menlo Park, CA 94025
Phone: 800-227-8431

AGRICULTURE SERVICES

Agricultural information is important not only to farmers, but also to anyone involved in commodities or the food service industry. Most agricultural databases provide information these individuals need to make planning decisions.

Agnet

The Agnet service provides commodity prices from all of the major boards of trade (Chicago, Kansas City, Minneapolis, and so on). Also included in the service is an electronic mail and teleconferencing system and electronic classified ads.

Agnet
105 Miller Hall
University of Nebraska
Lincoln, NB 68583-0713
Phone: 402-472-1892

Agricola

Agricola (short for "Agriculture On-Line Access") is a general-purpose reference covering animal husbandry, soil science, forestry, agricultural chemistry, and similar topics.

U.S. Department of Agriculture
National Agricultural Library
Beltsville, MD 20705
Phone: 301-344-3937

Agriculture

The Agriculture information service is more useful for investors and others involved in farm-related businesses than it is for working farmers. Information includes price fluctuations, weather patterns, and government regulations on a worldwide basis.

Data Resources, Inc.
Data Services
1750 K Street, NW
Washington, DC 20006
Phone: 202-862-3700



SPECIALIZED INFORMATION SERVICES

General-purpose information utilities like CompuServe, The Source, and the Dow Jones service should meet most of your telecommunications needs. However, there will be times when you need very detailed or highly technical information on a specific topic. When such an occasion arises, you may find the information you need in a specialized information service. Specialized services number in the hundreds, providing data on everything from entertainment to international economics.

Most specialized services can be accessed through standard telephone networks (Telenet, Tymnet, and so forth) or through an information utility (such as CompuServe or The Source). Some have their own dedicated dial-up numbers.

The cost of accessing specialized systems is as varied as the information they contain. Some government services are free, while some scientific or industrial systems may charge hundreds of dollars per hour.

This appendix describes a few generalized categories of specialized information services; a complete list is beyond the scope of this book. For additional information, see *Answers Online: Your Guide to Informational Databases* by Barbara Newlin (Osborne/McGraw-Hill, 1985).

UNIX, the log-on sequence should still look familiar. Notice that this system, like most, requires a “user name” (LOGIN:) and a password (PASSWORD). (In Figure 16-2, the person logging onto the system is AFITZGERALD.) In addition, the password does not appear on the screen as you type it in. Once you have logged on, you are told when you were last on the system and whether or not someone has sent you any electronic mail; the system also prompts you to identify the type of computer terminal you are using. In the example, the N command is entered, telling the system that an “unknown” terminal is being used.

```
SYSTEM V UNIX (TTYD3)

LOGIN: AFITZGERALD
PASSWORD:
LAST LOGIN: WED MAY 16 16:59:07 ON TTYD3
SYSTEM V UNIX #3: FRI APR 27 12:26:55 PST 1984

>>> TERMINAL ROOMS WILL BE LOCKED AT NIGHT AND ON WEEKENDS FOR
      SECURITY REASONS.

YOU HAVE MAIL.
TERM = (ADM3A) N
TYPE N UNKNOWN
ERASE SET TO CTRL-H
KILL SET TO CTRL-X
NO NEWS.

% MAIL
MAIL VERSION 2.18 5/19/83. TYPE ? FOR HELP.
"/USR/POOL/MAIL/AFITZGERALD": 1 MESSAGE 1 NEW
>N 1 DSSMITH@UCCD THU MAY 17 04:28 332/14088 "TODAY'S STOCKS"

& S 1 STOCK32
"STOCK32" [NEW FILE] 332/14088
& D 1
& Q

% WHO
BCLEA      TTYD0      MAY 17 09:41
BERHSAD    TTYD1      MAY 17 09:42
CARVAOH    TTYD2      MAY 17 09:45
CC-39      TTYJ3      MAY 17 09:39
CS164-4    TTYK4      MAY 17 09:15
AFITZGERALD TTYD5      MAY 17 09:14
KSHALL     TTYI1      MAY 17 09:53
KJPRIEE    TTYI2      MAY 17 09:23
JBAKER     TTYI8      MAY 17 08:53
CLINE      TTYP1      MAY 17 05:23
LIBBIE     TTYP2      MAY 17 08:59

% LOGOUT
```

Figure 16-2. *Sample telecommunications session with a VAX running the UNIX operating system*

hardware and how you establish a communications link.

Figure 16-2 describes a session in which a Macintosh running MacTerminal is telecommunicating with a VAX computer using the UNIX operating system. In this case, the VAX computer is located in the computer center of a major university, while the Macintosh is miles away.

If you are familiar with UNIX, you will notice that UNIX commands can be executed from the Macintosh keyboard. And even if you are not familiar with

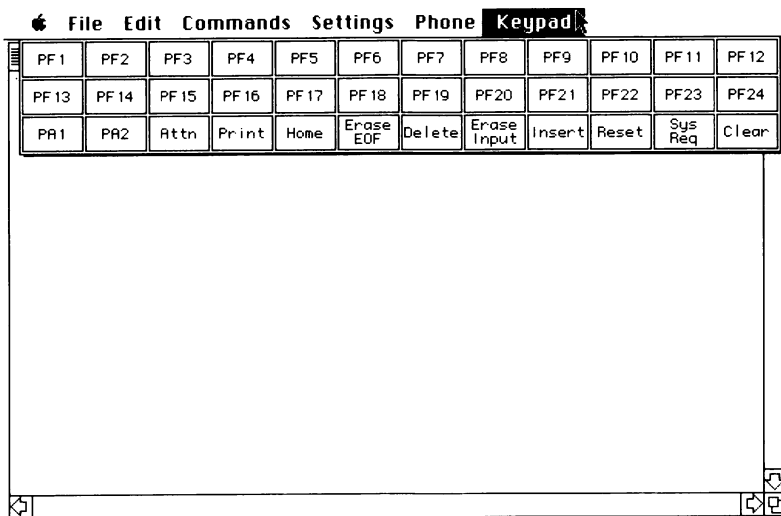


Figure 16-1. *The MacTerminal keypad for emulating IBM 3278 function keys*

You do need to be aware that there are some differences between the IBM's key characteristics and the Macintosh's. The IBM, for instance, has specified "function keys" that aren't on the Macintosh keyboard. However, you can emulate these function keys by selecting the Keypad option from the MacTerminal menu bar. When you have specified the IBM 3278 terminal type (from the Terminal Settings dialog box), move the mouse to the Keypad option; a "keypad" like that in Figure 16-1 will be displayed. After you have begun communication with an IBM and it expects a function key response, simply "pull down" the keypad, drag the mouse to the appropriate key, and click the mouse. The correct code will be sent to the other computer just as if you had pressed a key on the keyboard.

Other keyboard differences include the IBM Control key (on the Macintosh it is the COMMAND key), the Escape key, and the Dual Case/Mono Case key (the CAPS LOCK key on the Macintosh). Other special keys may also be used.

MODEM CONNECTION TO A MAINFRAME

For the most part, there is little difference between the actual operation of a Macintosh that is connected directly to a mainframe and a Macintosh that is "teleconnected" to a mainframe. The differences are in how you connect the

However, be aware that some DEC computers use the VT52 escape code protocol; if you are communicating with a computer that does, be sure to check the VT52 circle. By selecting the Keypad option on the menu bar and displaying the keypad, you can emulate the cursor movement required of VT100 terminals.

Communicating directly with an IBM 370 series computer, however, is somewhat more complicated, since both the Macintosh hardware and software must be set up in a special way.

First of all, you will need to connect one of two available accessory hardware devices, either an AppleLine or the Apple Cluster Controller, to the Macintosh modem port. Technically speaking, these devices perform the protocol and character conversion necessary to transfer data between the two computers. The following discussion will use the AppleLine controller as an example.

To set up the hardware, plug one end of the coaxial cable into the modem port of the AppleLine controller, and the other end of the cable to the phone/modem port of the Macintosh. (You may also need to insert an adapter between the controller and the Macintosh.) Next, connect the AppleLine unit to the IBM computer.

To set up the software, load the MacTerminal program into your Macintosh and open a document. From the Terminal Settings menu, you will need to set the terminal compatibility to match the IBM computer:

Terminal ☐ UT100 ☐ TTY ☒ IBM 3278

When you select this option, notice that at the same time the Compatibility line becomes inaccessible, the Protocol Conventions line conversely becomes accessible. Check the appropriate circle, depending on whether you are using an AppleLine or a Cluster Controller:

Protocol Conv. ☒ AppleLine ☐ Cluster Ctlr.

Once you have completed the Terminal Settings, display the Compatibility Settings dialog box. Set the baud to 9600 and specify that the Connection is to another computer, not a modem.

Before actual communication with the mainframe can begin, you must initialize the AppleLine controller. This requires you to send an “autobaud” message and execute the AppleLine’s Supervisor program. Your AppleLine manual describes these procedures in detail.

Once you have met all of the hardware and software requirements, you can begin communicating with the mainframe computer. This typically requires you to log onto the mainframe system, communicate with it, and then log off. The specific sequences for each step depend on the system you are communicating with the applications you are running.

system operator to find out specific communications protocol and requirements. Be aware that when you use your Macintosh as a terminal, there may be times when some of the keys perform differently from what you expect. This is because the specific function of a key depends upon the type of computer you are communicating with and the software it is running. For the most part, though, most Macintosh keys will be interpreted correctly by the mainframe computer.

A Macintosh used as a terminal offers several advantages over a traditional terminal. For one thing, a terminal isn't capable of storing and processing information; a Macintosh is. Second, data that is downloaded from a mainframe can be processed by a Macintosh word processing, spreadsheet, or other applications program.

There are two ways a Macintosh can communicate with a mainframe: either via "telecommunications" (using a telephone and modem) or by "direct connection" (using a cable to directly link a Macintosh to a nearby mainframe). With telecommunications, the mainframe computer may be hundreds of miles away; with direct connection, the Macintosh is usually in the same building as the mainframe, or at least not more than 2000 feet away. In either case, your Macintosh may take on the characteristics of the mainframe computer, becoming a "terminal" for the more powerful computer. Keyboard layout and character-code responses are the typical differences between mainframe and microcomputers. Mainframes generally have different, more specialized keys (in addition to the standard alphanumeric keys) and use a character code called EBCDIC (Expanded Binary Coded Decimal Interchange Code). Microcomputers, on the other hand, have keyboards suited for more generalized applications and use the ASCII (American Standard Code for Information Interchange) character code. If a microcomputer like your Macintosh is to communicate with a mainframe, there must be some way for the two computers to understand each other. To make this communication possible, a Macintosh can be configured to conform to mainframe protocol whether communication is direct or over the telephone.

DIRECT CONNECTION TO A MAINFRAME

While there are many different mainframe computers you may want to communicate with, the most common ones are the IBM 3278 and the DEC VT100. You can configure your Macintosh to emulate both computers using MacTerminal's Terminal Settings dialog box (displayed when you select the Settings option on the menu bar). When you start up MacTerminal, the terminal compatibility is set to VT100 by default. To communicate with a VT100, simply connect a coaxial cable to the Macintosh modem connector on one end and to the communication controller port of the DEC on the other. For most applications, leave the Compatibility line of the Terminal Settings dialog box set to ANSI escape code protocol.

MACINTOSH-TO-MAINFRAME COMMUNICATIONS

Computer-to-computer communication is not limited to information services and bulletin boards. If you are a student or businessperson, for instance, you might need to communicate with a mainframe computer at school or at work.

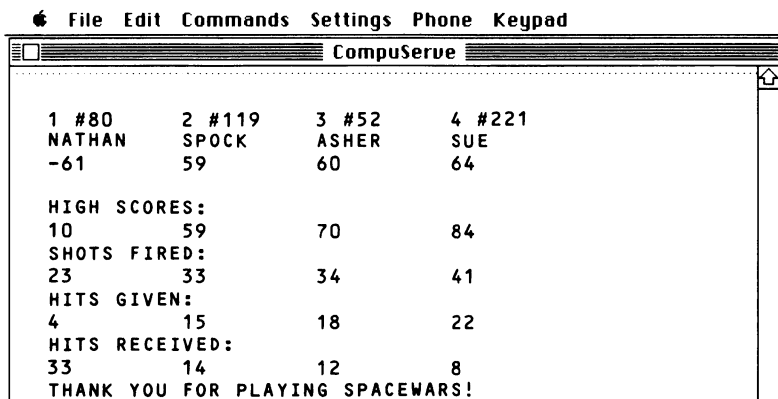
Many businesses and universities have large mainframe systems that are used by individuals for a variety of applications, including word processing, accounting, inventory analysis, and research. In most instances, these systems are used primarily during normal working hours. If your Macintosh is located no more than 2000 feet from the mainframe, you can use special hardware to connect it to the larger computer “directly.” However, some systems become overloaded during peak hours, resulting in a fewer number of terminals available for use and slower access time for the ones being used. The obvious solution to such problems is to use the system during “off hours,” when fewer people are using the facilities. Unfortunately, it isn’t always convenient to return to the office or university computer lab late at night. But if the mainframe computer system is equipped with a modem and communications software (and most are), you can log onto the mainframe with your Macintosh and use the system. In most cases, you can use your Macintosh in much the same way as you would a computer terminal that is directly connected to the mainframe computer.

Before trying to log on to a mainframe, be sure to contact the mainframe’s

The current score for all participants is displayed whenever you type **S** and press RETURN. Each player's number, a "job" number (a special CompuServe code you needn't worry about), and the player's name and current score will be displayed like this:

1 #80	2 #119	3 #52	4 #221
NATHAN	SPOCK	ASHER	SUE
-61	59	60	64

Exiting the game is a simple matter of typing **E** and pressing RETURN. When you do so, the final scores of all players will be displayed along with their high scores, the number of shots fired, and the number of hits given and received:



You will then return to the MSW menu shown in Figure 15-4. You can log off the system by typing **BYE** and pressing RETURN.

If you want to say hello to the other players before you begin the game, you can use the “talk” feature. You have the option of talking to all of the players at once or to an individual player. To send a message to everyone, simply type **T** followed by a **0** and then the message. For instance, you can type **T0 SPOCK IS HERE TO RID THE UNIVERSE OF ALIENS** and press RETURN. If you want to send a message to an individual player, type **T** followed by the player’s number and then the message. For instance, you might type **T3 ASHER, LET’S TEAM UP AGAINST NUMBER 1** and press RETURN.

Once you have all of the preliminaries out of the way, you can begin playing. To see what the board looks like in the 5×5 grid around your spaceship, type **D** (for “display”) and press RETURN. If you don’t see any other spaceships in your area, begin moving your ship (use **M**, **L**, or **R**) until a number appears on the screen. After each movement, the current board is displayed automatically.

As you move around the grid, you will encounter various obstacles, most of them stars and clouds. You can move through or hide in clouds, but you take chances when doing so. If you are hiding in a cloud, your normal spaceship symbol (**^**, **V**, **>**, or **<**) becomes **A**, **U**, **]**, or **[**, indicating that the ship is in a cloud but facing up, down, right, or left respectively. At times you will encounter a dangerous situation when entering a cloud or coming too near a star (you can also lose 10% of your score for ramming a star), and a message like this may appear:

```
THE STAR'S GRAVITATIONAL FIELD HAS SWUNG
YOU FAR BEYOND YOUR INTENDED ORBIT. IN
ADDITION TO HAVING YOUR CREW SHAKEN UP,
YOU HAVE LOST 10% OF YOUR POINTS!
```

When you do encounter another player (as in the following display), type **F** to fire a missile.

```
+ . 1 . *
+ . . . .
+ . ^ . .
+ . . C .
+ . . . .
```

If you score a hit on the other ship, a message telling you so will appear. For instance, if you fired at and hit player 1 in the previous example, the message **HIT 1** appears and 8 points plus a percentage of the other person’s score is added to your total score. If you fire and miss, the message **MISSED** appears and you lose one point.

When another player fires at and hits your ship, a message telling you this will appear. If, for example, player 1 hits your ship, the message **HIT BY 1** is displayed and your score decreases.

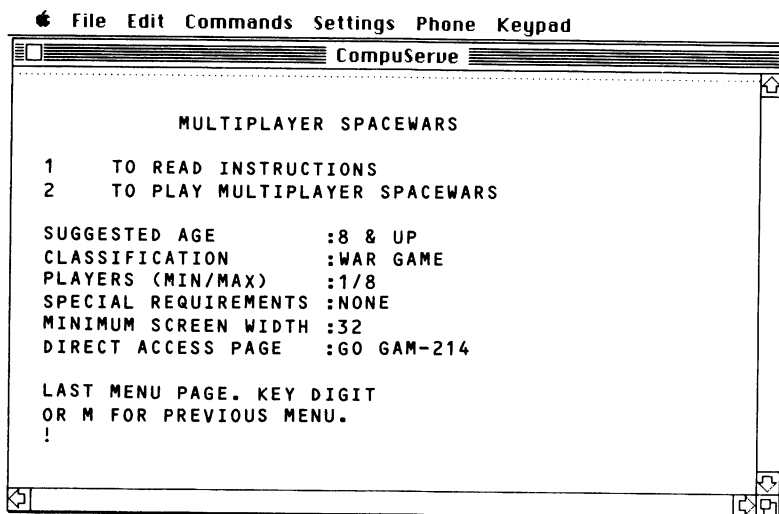


Figure 15-4. *Multiplayer Space Wars (MSW) introductory display*

out who else is playing the game. To do so, type **U** and press RETURN; a display similar to this one will appear:

A screenshot of a CompuServe window titled "CompuServe" showing a list of players. The window has a menu bar with "File", "Edit", "Commands", "Settings", "Phone", and "Keypad". The main text area displays a table with the following data:

NUM	USER ID	NOD	SCORE	NAME
1	70707,707	NAS	-61	NATHAN
2	60606,606	DAL	59	SPOCK
3	50505,505	SFA	60	ASHER
4	40404,404	TOR	64	SUE

The first column lists the numbers assigned to the players; remember that you can see all numbers except your own on the board. The second column lists the user ID of each player; this is entered automatically when each player joins the game. The third column (labeled NOD) tells where all the game participants are located; player 1, for instance, is in Nashville, player 2 in Dallas, player 3 in San Francisco, and so forth. The next column tells each player's current score, and the last column lists the players' names.

ship. Points for hits are calculated with the following formula:

$$\text{points} = \frac{\text{target's score} - \text{your score}}{8} + 8$$

For instance, if you have 60 points and you fire at someone who has 100 points, the points are calculated like this:

$$13 = \frac{100 - 60}{8} + 8$$

You would therefore get 13 points for hitting the other ship.

When your ship is hit, your score is decreased by the following formula:

$$\text{points} = \frac{\text{target's score} - \text{your score}}{8}$$

You lose 1 point if you fire at another ship and miss and 10% of your score if you ram into another player's spaceship or a star other than your starbase.

PLAYING MULTIPLAYER SPACEWARS

Once the menu in Figure 15-3 is displayed on your Macintosh screen, select option 5 (Multiplayer SpaceWars) by typing **5** and pressing **RETURN**. When you do, a MSW menu like the one in Figure 15-4 appears. It takes a few minutes to gain access to the game, but when you do, a welcoming message appears, you are asked to enter the name you want to play under, and you are assigned your spaceship number. In the following example, assume you entered the name "Spock" and are identified as player 2.

WELCOME TO SPACEWARS!

YOUR NAME PLEASE: SPOCK

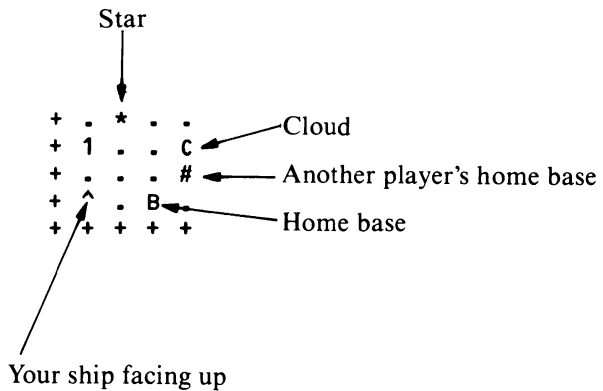
YOU ARE NUMBER 2
TYPE H FOR HELP

```
+ * # . .
+ . . . .
+ # ^ * .
+ + + + +
+ + + + +
```

Before beginning your search-and-destroy mission, you should probably find

When you join a SpaceWars game, you are assigned a number. In the previous example you might be player 2. You will see the direction that your ship is facing; the other players simply see your number.

A number of other elements can be displayed on the board as well:



In this example your ship is in the lower-left corner of the screen (the + signs indicate the “edge” of a board sector), facing up. To your right is your “home base” (the letter B), a safe haven for you. Two squares in front of you is player 1. To that player’s right is a “cloud” (the letter C). Clouds can be a safe hiding place or they be dangerous as you move through them, so approach them with caution. Just below the cloud is another player’s home base (the #), while on the top row is a “star” (the *).

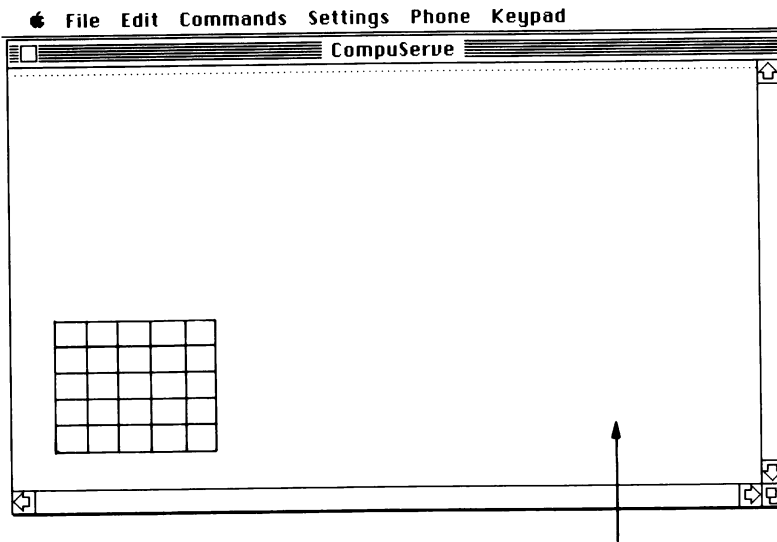
In addition to the movement and firing commands, there are a number of other commands you can use throughout the game. Pressing D, for instance, allows you to see what your segment of the board looks like at any one time. Pressing S displays all of the current scores; pressing U provides you with a list of the other players.

You can “talk” to any player in the game (to discuss strategy, for instance) by typing a message to that player. To type a message, press T followed by the player’s number as it appears on the board. Enter the message and then press RETURN. If at some time in the game you don’t know what to do, press H for “help.” To exit the game, press E, and your final score will be displayed as you return to the MSW introductory menu.

How the Game Is Scored

The CompuServe computer keeps score for you and the other players. Points are scored a number of different ways. You get points, of course, when you fire upon and hit another player’s ship. The other player loses points when you hit his or her

MSW “board” at a time. Think of the MSW board in this way:



Visible Macintosh screen

As this illustration shows, the actual board is like a checkerboard. As you move your “spaceship” around the board, more of the playing area becomes visible.

Your spaceship appears on the board as a ^, >, <, or V, depending on the direction it is facing: facing up is ^, facing down is V, facing right is >, and facing left is <. If you want to turn the ship in another direction, press L or R to rotate the ship’s direction either left (counterclockwise) or right (clockwise). Once a ship is facing in the appropriate direction, press M to move it forward one square at a time. Other ships in the game are identified as numbers on the board. Any time you are facing another ship, you can “fire” on it or it can fire at you; to fire on another ship, simply press F. The following illustration shows a number of board elements:

```

. . 1 . .
. > . . .
. . . . .
. . 3 . .
. . . . .

```

If you wanted to fire on spaceship 1 (on the top row), for instance, you would press L to rotate your ship to the left so it would be pointing up. You would then press M to move it up one space and press R to rotate the ship to the right so it be facing ship 1. Finally, you would press F to fire on the ship.

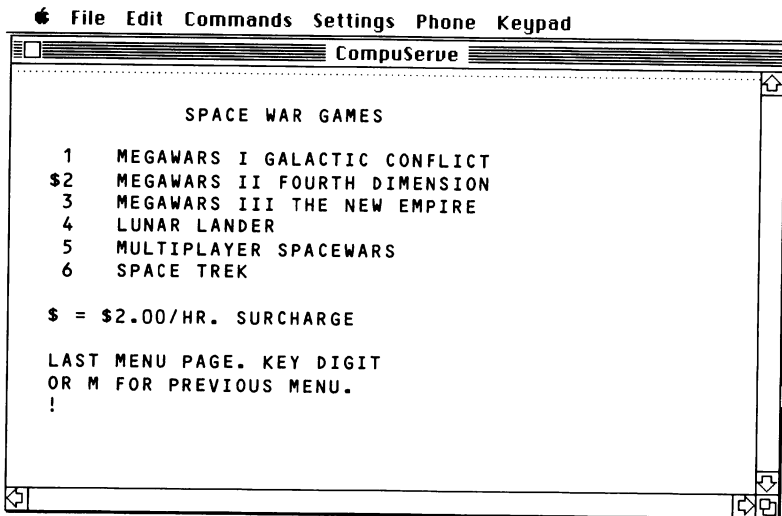


Figure 15-3. *CompuServe Space Games main menu*

- MegaWars III The New Empire allows from 1 to 100 players (12 years old and up). The game simulates the colonization of the galaxy as you inhabit planets. You fly your ship around the universe, exploring space and defending yourself against enemies. Once you have colonized a planet, you must support the population by manipulating its economy.
- SpaceWars, the game described throughout the rest of this chapter, is your best introduction to multiplayer games. From one to eight players can take part, and the recommended age is only 8 years old and up.

The goal of the game is to find and destroy other spaceships. You will get points for each ship you hit but lose points when another player scores a hit on your ship.

MULTIPLAYER SPACEWARS

If you have ever played a traditional board game, you should be able to master a Multiplayer SpaceWars (MSW) game without much difficulty. The main difference between MSW and a traditional board game is that you only see a part of the

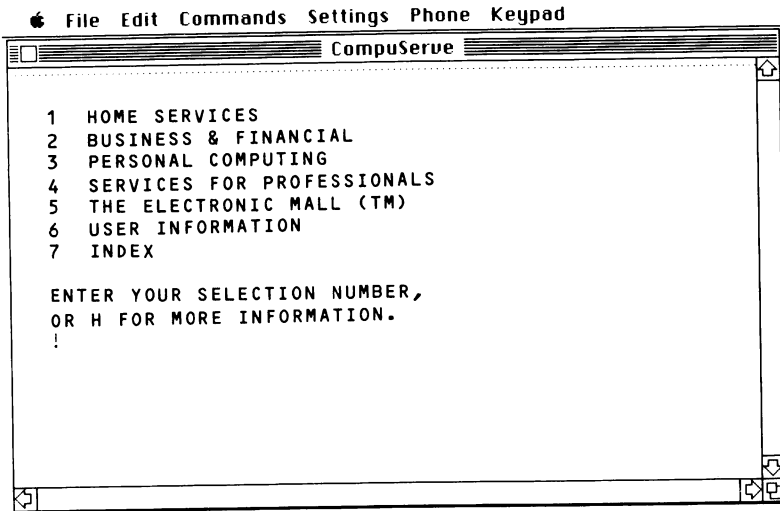


Figure 15-1. The CompuServe Information Service main menu

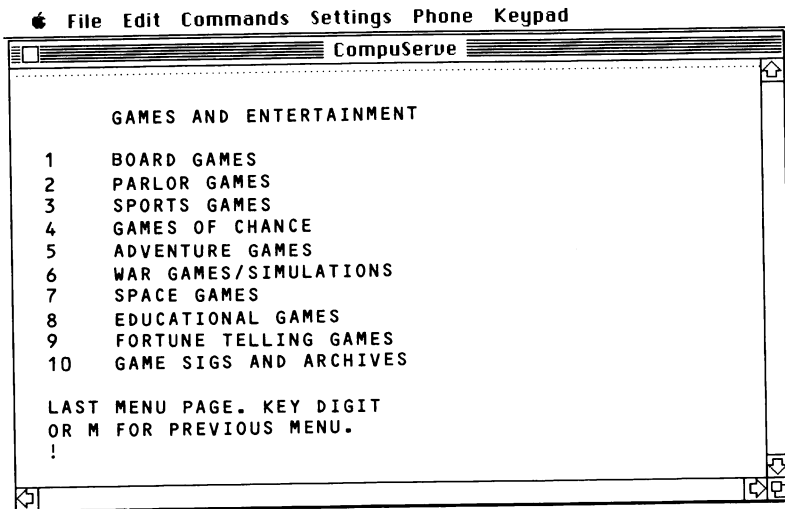


Figure 15-2. CompuServe Entertainment main menu

(board games, parlor games, adventure games, and so forth), including multiplayer contests that in some cases can match you against 99 other computer users across the country. CompuServe offers a number of multiplayer games such as SpaceWars, Sea Wars, and three versions of a space game called MegaWars. In each game you compete against other participants or on teams. Keep in mind that you do not play against the CompuServe computer; its role is simply that of a coordinator or “umpire”: it keeps score, ensures that you play by the rules, tells you who else is playing, and so on.

Using CompuServe’s SpaceWars as an example, this chapter will describe how you can join and enjoy a multiplayer game. For specific instructions on playing the game, in-depth manuals are available through the information service.

ACCESSING COMPUSERVE’S MULTIPLAYER GAME AREA

Before accessing CompuServe, be sure your Macintosh telecommunications system is set up properly. Once the system is connected and the software is running, begin dialing your local CompuServe number. When prompted, enter the phone number and log onto the service (see Chapter 4 for details).

Once you have successfully logged on, the CompuServe main menu shown in Figure 15-1 will be displayed. When the command prompt is displayed (the !), type **GO GAM-1** and press RETURN to go directly to the Games and Entertainment area. When you do so, a menu similar to the one in Figure 15-2 will appear.

You can access the SpaceWars game by selecting option 7, Space Games (just type 7 and press RETURN). When you do, CompuServe will present a menu (like the one in Figure 15-3) that lists the different space games available.

Lunar Lander and Space Trek are single-player games, while the other four — MegaWars I, II, and III and SpaceWars — are multiplayer games:

- **MegaWars I** Galactic Conflict is a multiplayer game for one to ten people. This version of MegaWars has a medium level of difficulty and is recommended for people 12 years of age and older. Instructions are available on-line by using the game’s “help” feature; an instruction manual is available at extra charge.
- **MegaWars II** Fourth Dimension is the advanced version of the game and is recommended for one to eight players (12 years old and up). To play this version of the game, you must be using a telecommunications system that has color, graphics, and sound capabilities.

Notice that the MegaWars II option is prefaced by a \$; this means that you will be charged extra if you select this game.

The game involves two teams of four players each. Each team tries to destroy or capture the other team’s spaceships. Any unclaimed ships are controlled by a robot.

15

PLAYING TELEGAMES

If you have been using a Macintosh for any time at all, you know that it is probably the best personal computer available for playing games. And if you have been playing computer games, you have probably found that there are two basic types: *single-player* games that you play by yourself or perhaps against the computer, and *multiplayer* games that you play with another person or on a team. Multiplayer games are the most exciting of the two because they allow you to compete and interact with other people.

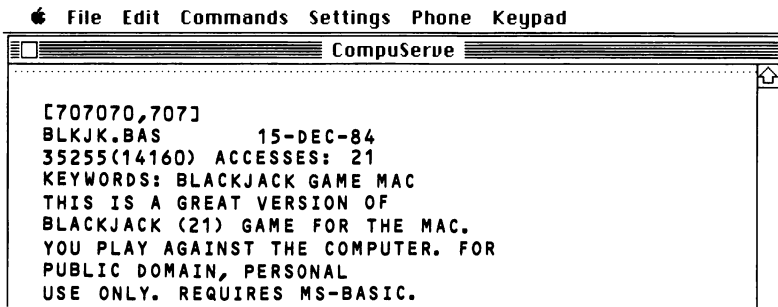
One problem with multiplayer games, however, is that both you and the other person must be sitting in front of your Macintosh. *Multiplayer telegaming*, game playing with other people over telephone lines, overcomes this obstacle. This method of entertainment enables you to compete against one or more people who are also using computers. Each person taking part in the game can be situated in a different location: you can play a game simultaneously with people in Dallas, Boston, New York, Seattle, and other cities, or with someone on the other side of town. The computer instantly transmits the players' responses.

Telegaming is made possible through special software that enables two computer users to compete via telecommunication. In addition, some computerized bulletin boards (see Chapter 14) scattered about the country are set up especially for long-distance game playing.

A more practical version of telegaming is available through the CompuServe Information Service. This information service offers several categories of games

the transfer operation takes place, your screen will be filled with a series of messages, including the size of the file being downloaded.

Once the download is complete, the menu in Figure 14-4 will reappear and you can view the next available program file (press RETURN), exit the database to return to the main SIG menu (type **EXI** and press RETURN), or log off the system by typing **BYE** and pressing RETURN. If you choose the last option, the Compu-Serve sign-off message will appear. If you saved the program on disk, check the Finder screen to ensure that the program is on disk and look for the filename **BLACKJACK**. If it is on the Clipboard, you can paste it into a **BASIC** file. Finally you can load **BASIC**, load the program, and execute it to play the game.



Once a description of a program has been displayed, a menu like the one in Figure 14-4 will appear. The main function of this menu is to allow you to “read” (list) the program or download it into your Macintosh.

To download the Blackjack program described in the previous sample display, simply type **2** or **D** and press RETURN when the menu in Figure 14-4 is displayed. You can then save the program onto your Clipboard or receive it into a disk file.

In this instance you might enter **BLACKJACK** and press RETURN. The program will then be saved on your Mac disk under the name of “BLACKJACK.” As

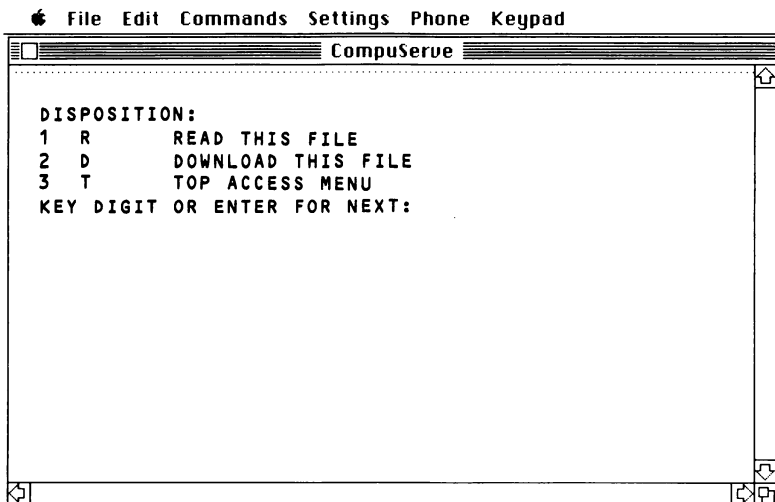


Figure 14-4. *CompuServe SIG File Disposition menu*

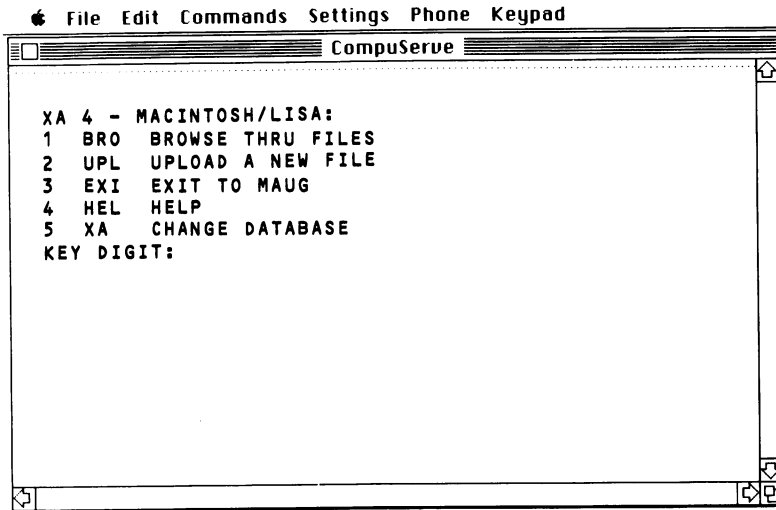


Figure 14-3. Sample CompuServe SIG Database menu

using database 4. To enter this database, type **4** and press RETURN. When you do, a menu like the one in Figure 14-3 will appear.

Using an Apple SIG Database

As you can see from the menu in Figure 14-3, you need to be familiar with several commands in order to download public domain programs. The first command, Browse, allows you to peruse the database's contents. When you select the Browse option, the name of the program, the user ID of the person who submitted it, the date it was submitted, and a brief description of what it does will be displayed. After you choose the Browse option, two additional options appear: /AGE and /KEY. Simply pressing RETURN in response to both prompts enables you to browse through all of the available programs in the current database. You can, however, answer one prompt to select only the programs submitted within a specified time period (the /AGE prompt) or on a specific topic (the /KEY prompt). The following is a sample description of a program in public domain.

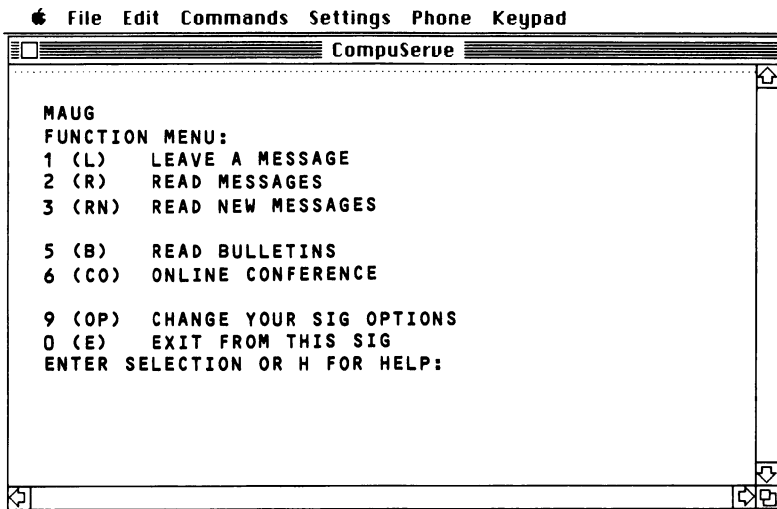


Figure 14-2. *Main SIG menu*

Not all of the databases contain programs. The subject matter contained within the various databases may be as follows:

Database	Topic
0	SIG Business
1	Programming
2	Software (Apple II)
3	Hardware (Apple II)
4	Macintosh/ Lisa
5	Apples and Modems
6	Community Square
7	Apple III
8	Correspondence/ Clones

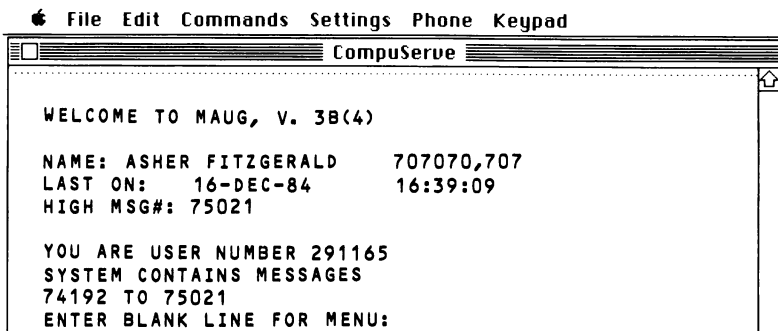
You select a database by simply entering the database number and pressing RETURN. The following example will illustrate how to download programs by

GO PCS-51 and press RETURN to go directly to the Apple users group area. It will take a couple of minutes to gain access to the area, so the following message will appear:

```
REQUEST RECORDED,
ONE MOMENT, PLEASE
THANK YOU FOR WAITING
```

Entering the Apple SIG

You must be a SIG member in order to use SIG services. All that is required is a bit of information about yourself: your name, CompuServe user ID, and so on. There are no special membership fees or charges. When you do become an Apple SIG member and log onto your group, a display similar to this one will appear:



As you can see, the SIG automatically knows who you are (by your ID when you logged onto CompuServe), and it keeps track of the last time you accessed the SIG. To get to the main SIG menu, simply press RETURN and a menu like the one in Figure 14-2 will appear. Instead of selecting any of the options, however, type **XA** and press RETURN. This will allow you access to the “database” area of the SIG, and a message similar to the following will appear.

```
DATABASE FOR WHICH SECTION:
0 1 2 3 4 5 6 7 8
```


domain. Copyrighted programs should not be uploaded or downloaded under any circumstances.

DOWNLOADING PROGRAMS FROM COMPUERVE'S APPLE SIG

A wide range of public domain programs is available for the Macintosh, and the CompuServe Information Services is one of the best sources for them. The rest of this chapter will describe how to download programs from CompuServe's Apple SIG. The procedures used are unique to CompuServe; individual bulletin boards may require different steps to download programs.

Before accessing CompuServe, be sure your Mac telecommunications system is set up properly; see Chapter 3 for details. Once the system is connected and the software is running, begin dialing your local CompuServe number. When prompted, enter your password and ID number to log onto the service (see Chapter 4 for details).

Once you have successfully logged on, the CompuServe main menu will be displayed (see Figure 14-1). When the command prompt is displayed (the !), type

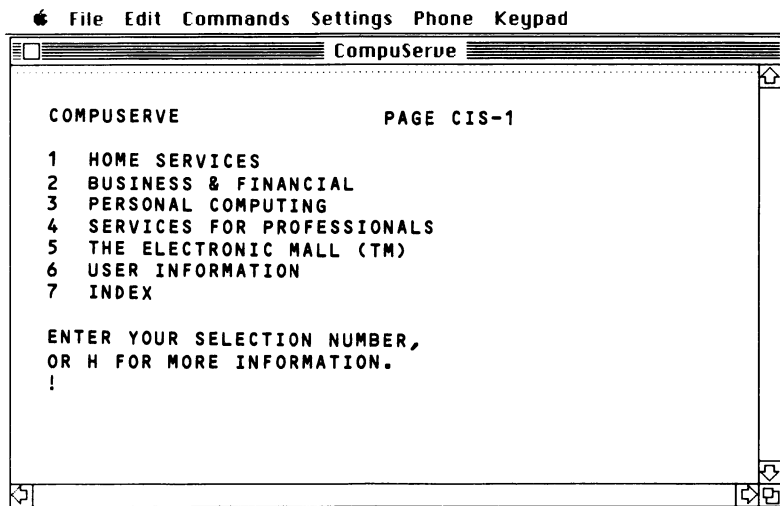


Figure 14-1. *The CompuServe Information Service main menu*

14

GETTING PROGRAMS FOR FREE

One of the most attractive incentives for becoming involved with telecomputing is the capability to download “public domain” software, programs not protected by copyright laws. Software available in the public domain includes everything from games to accounting programs. Such programs are typically written in BASIC, but many machine language programs are also available.

Public domain software is available from a number of telecommunication sources. Most information utilities (such as CompuServe) have organized special-interest groups, called SIGs, that provide software for computers like the Macintosh. Computerized bulletin boards are also a good source for such programs.

There are no direct charges for using public domain programs, although information utilities do charge you for your on-line connect time. Bulletin boards that are accessed free of charge may occasionally ask for a donation to help cover the expense of maintaining the system that stores the free programs.

Whatever the source of your programs, keep in mind that public domain software is for personal use only; you should not download the software to try to make a profit on it in any way. By the same token, if you decide to contribute a program written by someone else to a bulletin board, be sure it is in the public

Once you have identified a program you want to use, return to the command prompt and enter the download command **LOAD**. In some BBSs you enter the command followed by the program name; in other systems you enter the command and then the system will prompt you for the program name. The following illustration shows how a BBS prompts you for a filename after you have entered the **LOAD** command.

```
00:07:37 (Time Elapsed) Command > LOAD
```

```
Enter file name of program: FASTCOPY
```

You can then begin downloading the file. If you are using MacTerminal, either save the information on the Clipboard or receive it into a disk file.

Logging Off the System

When you are ready to end a bulletin board session, all that is usually required is to type **BYE** or **QUIT** and press **RETURN** when the command prompt is displayed. Remember that many systems will automatically log you off after 30 minutes.

Table 13-2. To find out the commands you can use with a particular system, type ? or **HELP** and press RETURN when the command prompt (>) is displayed.

To use a command, simply enter it when the command prompt is displayed and press RETURN. For instance, if you want to see an overview of all the messages on the board, you might type **O** and press RETURN. A list like the following might then appear on your Macintosh screen:

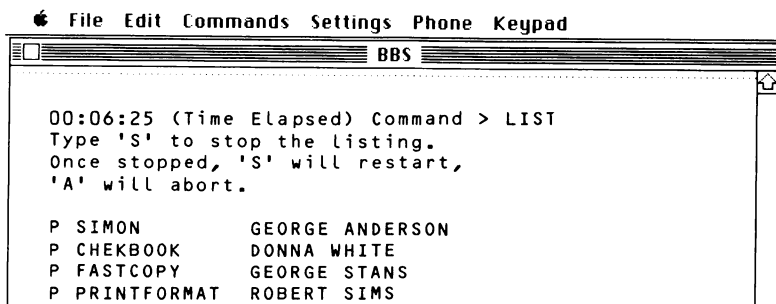
```
00:04:10 (Time Elapsed) Command > O
Type 'S' to stop the listing.
Once stopped, 'S' will restart,
'A' will abort.
```

```
Msg #   : 564 - Ref 6543
From    : BOB BURKE
To      : JIM HANSEN
Subject: New Macintosh game programs
```

```
Msg #   : 563 - Ref 6542
From    : BOB CRAMER
To      : SUE MARRIOTT
Subject: Help with 68000 assembly language
```

```
Msg #   : 562 - Ref 6541
From    : PAT DAVIS
To      : MARVIN VOGT
Subject: Political elections
```

If you are interested in downloading Macintosh programs from the bulletin board, you can check what programs are available by entering the **LIST** command when the command prompt is displayed. Typically, the name of the program will appear, followed by the name of the person who submitted it to the board. Knowing who wrote the program is useful if you have any questions about the program and want to send a message asking about it. A program list might look like this:



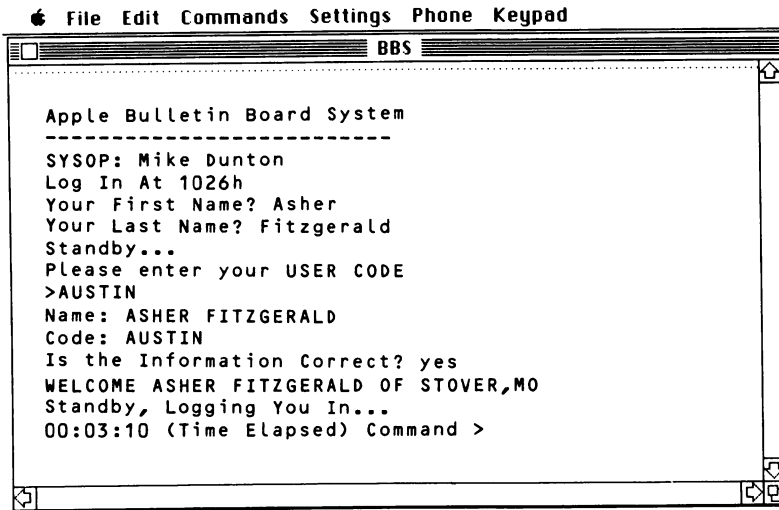


Figure 13-1. Typical BBS log-on sequence

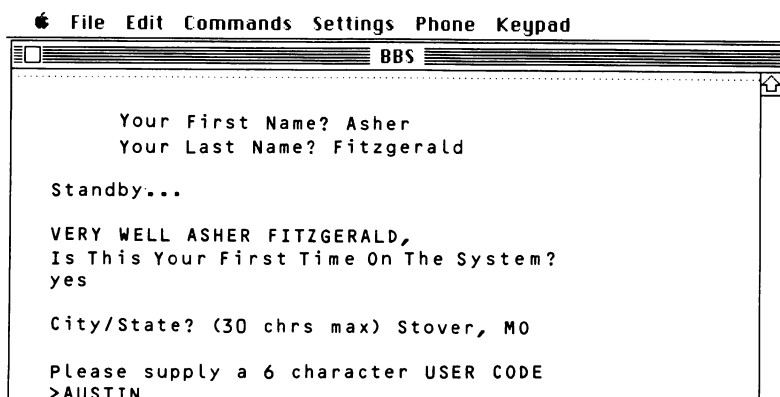
Entering Bulletin Board Commands

Once you have completed the log-on sequence and the command prompt is displayed, you can begin entering commands. Again, the commands you use will depend upon the board you have accessed. A few common commands are listed in

Command	Function
A	Read <i>all</i> messages sent to you
BYE	Log off the bulletin board system
E	Enter a message to another member
LIST	List available programs
LOAD	Download a program from the BBS
O	Overview of board messages
P	Reply to the current message
S	Summary of available messages
SAVE	Upload a program to the BBS
U	Display user log

Table 13-2. Typical BBS Commands

In this example Asher is using the code “Austin,” as the following sample illustrates.



Finally, all the information you have entered is redisplayed for your confirmation:

```
Name: ASHER FITZGERALD
City: STOVER,MO
Code: AUSTIN
```

```
Is the Information Correct? yes
```

```
Standby, Logging You In...
```

Once the system has logged you on, the command prompt will appear. Often this is nothing more than the `>` symbol. In some systems, however, this prompt is prefaced by a *time elapsed* message telling you how long you have been on the system. The time elapsed message usually appears only on bulletin boards that limit your on-line time; after the designated time they automatically log you off and hang up the phone. A time elapsed command prompt may look something like this when you first log on:

```
00:03:10 (Time Elapsed) Command >
```

After you have registered with a bulletin board, you will usually be asked to enter your password or code once the system has identified you. The name you typed in is then displayed for confirmation. A typical log-on sequence for a BBS participant is shown in Figure 13-1. Notice that once you have entered your name and code, the system automatically knows where you live as well.

ACCESSING A BULLETIN BOARD SYSTEM

Once you have identified the bulletin board system you want to communicate with, be sure your Macintosh telecommunications system is set up properly. Once the system is connected and the software is running, dial the BBS number. When prompted, type in the phone number and begin the log-on sequence.

Although the log-on sequence for every BBS is somewhat different, the general format is similar. An introductory message usually appears, followed by a prompt asking for your name. The first time you access a system, you'll be asked to enter the city and state you are calling from. Finally, you will be asked what password you want to use to gain access to the system. (If you join a number of BBSs, it is a good idea to use the same password for all the boards; otherwise, you may forget which is which.)

USING A BULLETIN BOARD SYSTEM

This section illustrates how you can log onto and use a typical bulletin board (remember that every system will vary slightly).

Logging Onto the System

Once you have dialed the BBS phone number and the other computer has answered the phone, the message **CONNECT** appears on the screen, indicating that the teleconnection between your computer and the BBS has been made. This is followed by an introductory message from the bulletin board system:

```
Apple Bulletin Board System
-----
SYSOP: Mike Dunton

Log In At 1026h
```

The system automatically asks you for your first and last name. Enter your name when prompted and press RETURN. When your name has been entered, the bulletin board computer checks to see if you are a "registered" participant of the BBS. In some cases, you can become a member instantly; in other cases, you enter the required information and become a member after a few days.

In this next sequence, the user, Asher Fitzgerald, is logging onto the bulletin board for the first time. Other than his name, Asher must enter the location he is calling from. Since there may be more than one person with the same name, the system requires you to identify a unique code or password that must be entered when you log on. This code isn't for security purposes but simply for identification.

Bulletin Board	Description
Apple Bulletin Board West Palm Beach, FL 305-848-3802	Apple-related bulletin board; Sponsored by a computer store
Roger's Park Apple Bulletin Board Chicago, IL 312-973-2227	Apple BBS; on-line from 7:30 AM to 6:30 PM
Conference Tree Honolulu, HI 808-487-2001	General-interest board
Akron Digital Group Akron, OH 216-745-7855	Another Apple BBS; sponsored by a local Apple users group
Explorer's Aid Phoenix, AZ 602-991-0144	This board keeps "help" files for most of the popular adventure games
Apple-Bytes Sacramento, CA 916-361-0486	An Apple board requiring a password and ID to access it. Call voice from 8 AM to 5 PM for details.
Midwest Computer Camp Indianapolis, IN 317-297-5438	A general-interest, education- oriented board
NET-WORKS Portsmouth, NH 603-436-3461	A general-interest BBS
Pacific Medical Bulletin Board Santa Barbara, CA 805-522-1789	A special-interest board discussing medical topics
Children's Apple Tree San Francisco, CA 415-647-2560	An Apple from 4 PM to 10 AM Monday, Tuesday, Wednesday. Also from 6 PM Friday to 10 AM Monday.

Table 13-1. *Selected Computer Bulletin Board Systems (continued)*

This listing is updated on a regular basis and provides hundreds of BBS numbers in a variety of categories. Yet another publication, the *BBS Directory*, can be ordered from

BBS Directory
P.O. Box 4150-LU, Beach Station
Vero Beach, FL 32964-4215
Phone: 305-466-5515

The list of bulletin boards in Table 13-1 is a sampling of some available boards.

When you call a bulletin board phone number, it is a good idea to confirm that the phone number is a “data” line, not a “voice” line. To do so, dial the phone number. When the other phone answers, listen for a data signal (a high-pitched tone) before beginning telecommunication. If a person answers, ask if the bulletin board is still available.

Bulletin Board	Description
ABBS Gamemaster Chicago, IL 312-475-4884	A special-interest BBS
ABBS Apple Crate I Bulletin Board Seattle, WA 206-872-6789	Provides Apple programs and information
B.A.S.I.C. BBS Aurora, IL 312-896-9628	A general-interest board offering BASIC programs for a number of different computers
Board-Busting for Fun Houston, TX 713-488-2003	Offers you the opportunity to try “busting” a software code
Boston Information Exchange Boston, MA 617-423-6985	A general-interest board

Table 13-1. *Selected Computer Bulletin Board Systems*

mainframe computers and perhaps dozens of phone lines connected to them, a bulletin board system is usually a single system consisting of a personal computer, a disk drive, and an auto-answer modem. In addition, the computer must run special bulletin board software 24 hours a day or at least as long as the bulletin board is on-line. Several bulletin board programs are available commercially, although many bulletin boards operate on programs written by the individuals who maintain the system.

Once you begin accessing bulletin boards, you will probably encounter two problems: first, you must usually make a long-distance phone call to access a board unless you live in a large metropolitan area; second, you often get a busy signal when accessing a popular bulletin board. There isn't much you can do about either situation. Since bulletin board sponsors don't charge for their services, they can't be expected to maintain a toll-free phone number. Nor, for that matter, can they be expected to provide several phone lines and the computer hardware and software to support them.

You should keep in mind that bulletin boards are a cooperative effort on the part of the people who sponsor them and those who use them. You can do your part by sharing (uploading) programs and information with other participants and by limiting the time you are on-line. (Many bulletin boards automatically disconnect you after 20 or 30 minutes so that other people have a chance to use the system.)

LOCATING BULLETIN BOARD SYSTEMS

While many established BBSs have used the same phone number for years, bulletin boards tend to come and go. In some cases, the people who sponsor them (called "system operators," or "SYSOPs" for short) simply lose interest, while in other instances they find they can't afford the time or money to maintain the system. Consequently, any definitive list of bulletin board phone numbers is quickly outdated.

To find out if there are any bulletin boards in your area, check with your local computer store or Apple users group. Once you get the phone number of one bulletin board, other phone numbers become readily available, since most bulletin boards maintain a list of other BBSs. In a short time, your bulletin board phone list can easily consist of several hundred phone numbers.

Another source of BBS phone numbers is the *On-Line Computer Telephone Directory* available from

J.A. Cambron Company, Inc.
P.O. Box 10005
Kansas City, MO 64111
Phone: 816-756-1847

BULLETIN BOARD SYSTEMS

Computerized bulletin board systems (BBSs) were at one time nothing more than electronic message centers. Today they offer a variety of services and information ranging from religious conferences to telecommunications programs. And except for the cost of a phone call, using a bulletin board system is usually free.

Generally speaking, there are two types of bulletin boards: special-interest and general-interest bulletin boards. Special-interest bulletin boards usually focus on specific topics (such as medicine and sports) or on particular computers (such as your Apple). An Apple bulletin board, for instance, might offer public domain programs for the Macintosh, share technical information about your computer, and provide you with a forum to ask other Mac users how they use their computers. A science-fiction bulletin board might discuss books and movies or even let you take part in an ongoing spaceship adventure game.

A general-interest board, on the other hand, might offer a variety of topics for discussion. General-interest bulletin boards often have rotating topics of discussion—an upcoming political election during one month, a computer that has just entered the marketplace in another month. You convey your opinion by dialing up the bulletin board, reading the comments other people have made, and typing in your particular views on the topic.

Bulletin boards are typically installed and monitored by telecommunications enthusiasts or by a group, such as an Apple users group. While an information service like CompuServe may consist of a large building filled with many large

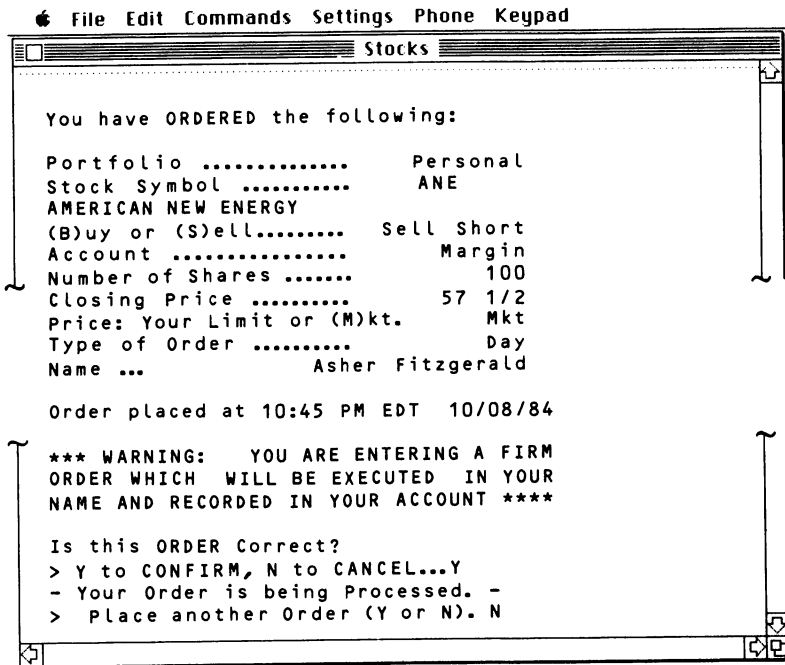


Figure 12-9. Sample order confirmation

News/Retrieval. (See Chapter 11 for a description of the Dow Jones service.) The background information provided by Dow Jones coupled with the ability to buy or sell stocks instantaneously provides you with an enjoyable and potentially profitable way of using your Macintosh telecommunications system.

```

- 211 BUY OR SELL STOCKS -
- Account: Asher Fitzgerald
- Type CTRL/C to Escape -
(N)ew Order, (C)ancel Former Order,
  or (I)f Nothing Done Order...
> Order Type: 'N,C,I) ..... N
(P)ersonal, (I)RA, (K)eogh
> Portfolio (P,I,K) ..... P
> Stock Symbol ..... ANE
AMERICAN NEW ENERGY
Closing Price is .... 57 1/2
> (B)uy or (S)ell ..... S
> Short Sale (Y,N) ..... Y
> Number of Shares ..... 100
> Price: Your Limit or (M)kt. M
> Password ..... SECRET
  
```

Figure 12-8. *Sample Trade*Plus order form*

prompts are in the left column and are preceded by a >. Your responses to the questions are in the right column.

Notice that you must enter a secret password before the order can be executed. This is the same password you use to log onto the service. When you have filled out the order form, a confirmation will be displayed before the stocks are bought or sold. (See Figure 12-9.) If all the information is correct, answer yes to the prompt.

LOGGING OFF TRADE*PLUS

Once you have completed all transactions and reviewed all the necessary information, you are ready to log off Trade*Plus. To do so, simply type 0 and press RETURN at any time. A sign-off message, which includes the time you were on-line, will then appear.

When you have logged off the service, you will be returned to the Telenet prompt. Simply “hang up” the phone to disconnect from the network.

It is important to note that the services available through most stock brokerage houses usually do not provide in-depth historical news about companies and industries. This information, which is sometimes crucial when making decisions about buying or selling stocks, is available through services like Dow Jones

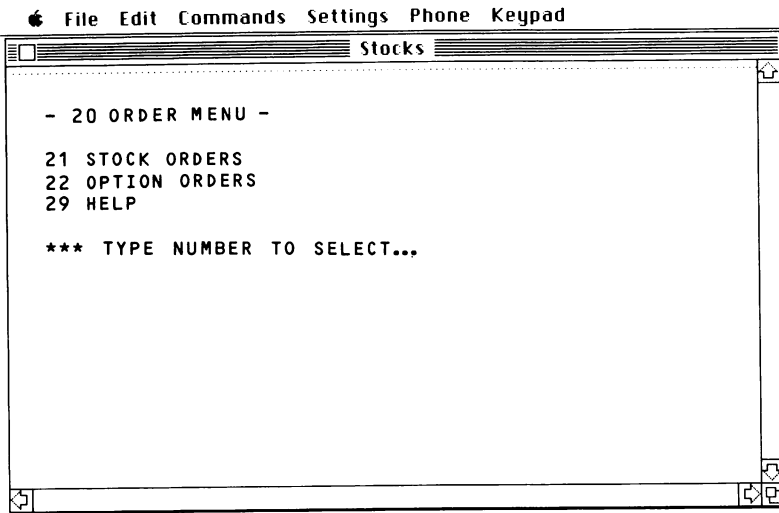


Figure 12-6. *Sample Trade*Plus Order menu*

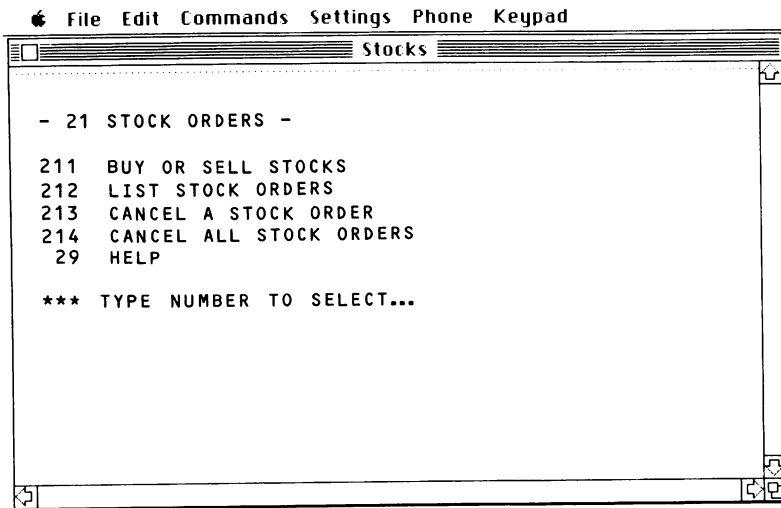


Figure 12-7. *Sample Stock Orders options*

```

- Closing Prices -
- Account: Asher Fitzgerald
- 10:29 PM EDT 10/28/84 1156.93 -11.0

VALUE # SECURITY QTY LS/M BOUGHT AGE COST CURRENT CHANGE
- Personal Portfolio -
11500 1 ANE 200L 10/10/81 31 35 57 1/2 +22 1/2
23088 2 FMZGX 740 6/06/82 23 23.42 31.20 + 7.78
13719 3 6P 250L 3/14/77 86 25 1/8 54 7/8 +29 3/4
12900 4 6Y 200L 9/29/79 56 60 1/4 64 1/2 + 4 1/4
1240 5 TYN 40L 2/20/82 27 35 31 - 4
12638 6 ZZN 300L 6/25/81 35 35 1/2 42 1/8 + 6 5/8
- IRA Portfolio -
6600 7 ABCL 200L 5/23/83 12 51 1/4 33 -18 1/4
6773 8 LBM 60L 3/14/82 26 60 7/8 112 7/8 +52
7325 9 ALU 200L 5/24/80 48 16 36 5/8 +20 5/8
- Keogh Portfolio -
3275 10 ATTE 100L 10/07/82 19 39 7/8 32 3/4 - 7 1/8
5719 11 FTE 150L 9/17/78 68 30 1/4 38 1/8 + 7 7/8
5635 12 RXT 140L 6/23/80 47 60 40 1/4 -19 3/4
*** Type the RETURN key to proceed.
```

Figure 12-5. *Sample portfolio*

As you can see, the contents of your portfolio include most of the information you need to make a selling decision.

If you want additional or more specific information about your portfolio, select other options from the Portfolio option (Figure 12-4). Option 316 (Display Unrealized Gains/ Losses), for instance, provides a summary of the gain or loss of each security. It would tell you, for example, that the personal stocks shown in Figure 12-5 have a total present value of \$75,084. The IRA and Keogh portfolios are worth \$20,698 and \$14,629 respectively.

Buying and Selling Stock

Just as in a stockbroker's office, buying and selling stocks begins by placing an order. To place an order with a home brokerage service, the main menu (shown in Figure 12-2) should be on the screen. When it is, select the Order menu by typing **20** and pressing RETURN, and the Order menu (see Figure 12-6) will appear.

Since you want to place an order, select option 21, Stock Orders, and the options for various stock orders will appear. (See Figure 12-7.)

Entering **211**, Buy or Sell Stocks, will result in the service displaying an "order form" (like the ones used at brokerage houses) for you to fill out. (See Figure 12-8.) This form must be completed before you can begin buying or selling stocks. The order form in Figure 12-8 has been completed for a sale of fictitious stock (ANE, listed in the sample portfolio shown in Figure 12-5). The brokerage service's

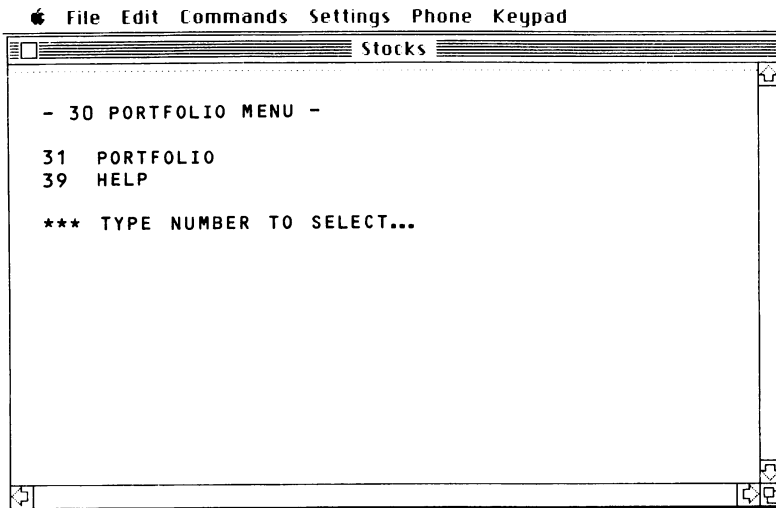


Figure 12-3. *Sample Trade*Plus Portfolio menu*

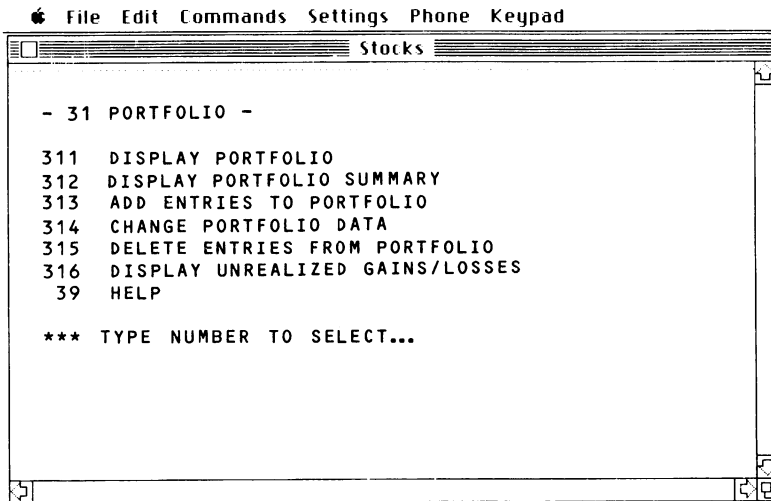


Figure 12-4. *Trade*Plus portfolio*

main menu: “housekeeping” tasks and trading tasks. Housekeeping tasks involve maintenance-type operations that are not directly related to stock transactions. These tasks include changing your password or getting help with commands and are numbered on the main menu from 0 to 9.

Being familiar with housekeeping aspects of the service may save you time and money in the long run. The service will, for instance, display the current prices of stocks in your portfolio as soon as you log on. This will significantly reduce your connect time.

The main menu also includes a number of trading operations, procedures directly related to financial transactions. The trading operations are numbered from 10 to 100 in the main menu. Ordering buys or sells, checking on current stock prices, and reviewing your portfolio are typical trading operations.

To illustrate the use of on-line brokerage services, the next section of this chapter describes how you can use your Macintosh to sell stock from your portfolio. Keep in mind that a on-line brokerage service assumes that you are familiar with most brokerage terms and procedures. If you encounter an unfamiliar term, the help feature, number 9 on the main menu, should explain it. If you still don’t understand a procedure or concept, however, you should consult your stockbroker before attempting the transaction.

Reviewing Your Personal Portfolio

You should be aware of the current status of securities in your personal portfolio before buying or selling stocks. When you first subscribe with a brokerage service, such information as the names and quantities of securities, dates of purchase, and purchase prices are entered into the database. Each time you review the information, all of this data, plus the current total value and market price per share, are displayed.

To review your portfolio, be sure the main menu is displayed (refer to Figure 12-2) and then select the Portfolio menu by typing **30** and pressing RETURN. The Portfolio menu (see Figure 12-3) will then appear. From this menu, select option 31 to review your portfolio. When you do, a menu like that in Figure 12-4 will appear.

By selecting option 311, Display Portfolio, the contents of your portfolio will be displayed in a format similar to that in Figure 12-5. (In this case, the stock symbols and figures are fictitious.) Each security is grouped according to its type: personal portfolio stocks, IRAs, and Keoghs. Notice that the total current market value for each type of stock is listed in the leftmost column, named Value, followed by the stock symbol for the security. (If you forget the abbreviated symbol for the company you want to trade with, refer to the program’s help feature.) Next the number of shares you own of each stock is listed along with the purchase date and the purchase price. The last two columns display the current market price per share and the change (plus or minus) between what you paid for the stock and its current value.

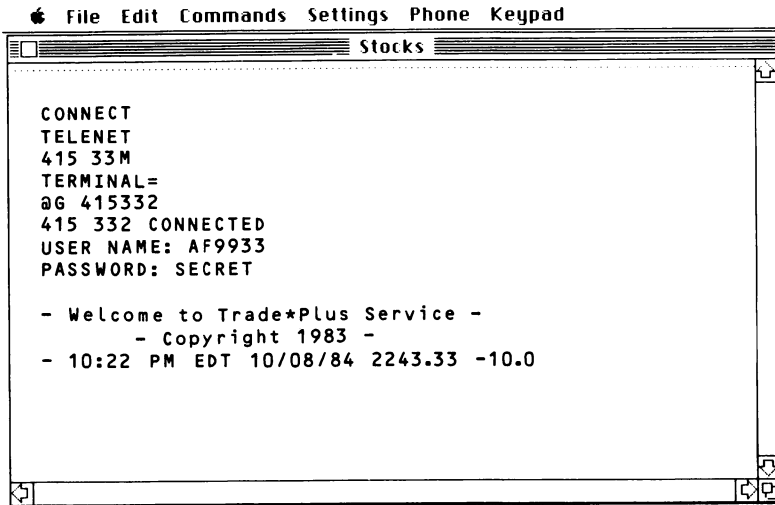


Figure 12-1. Sample log-on sequence for on-line brokerage service

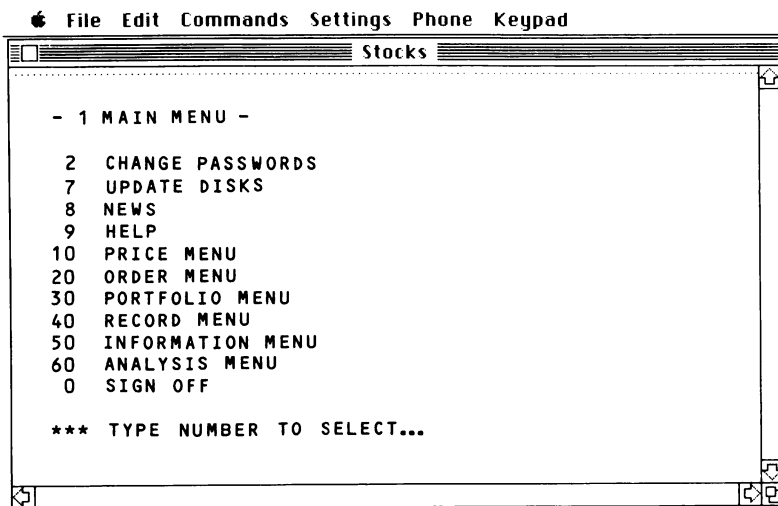


Figure 12-2. Sample Trade*Plus main menu

stockbrokers, you actually gain access to the Trade*Plus financial database that stores your portfolio and other financial information.

Brokerage service fees usually include a subscription fee and additional on-line charges ranging from 10¢ to 40¢ per minute, depending on the time of day you call. Average charges are about \$15 per month and include Telenet connect time.

MAKING THE BROKERAGE TELECONNECTION

Before dialing an on-line brokerage service, be sure your Macintosh system is set up correctly and that the communications parameters match those of the service (typically 300 baud, even parity, and 7 stop bits).

Connection to a Trade*Plus brokerage service is usually made through the Telenet network system. You should be provided with a local Telenet phone number when you subscribe to the brokerage service. When you dial the Telenet number, the first message that appears on your screen is **CONNECT**, next the word **TELENET**, and then a special code.

When the message **TERMINAL=** appears, simply press RETURN. After that, the prompt **@** will be displayed. At this time, enter the brokerage access code supplied to you when you subscribed to the service. For instance, type **G 415332** and press RETURN. This code tells Telenet which service to connect you to. This is followed by a message confirming that the brokerage service's computer has answered the phone.

Logging Onto an On-line Brokerage Service

Once the connection is made, the brokerage service will initiate a log-on sequence, first prompting you for your "user name" and then for your secret password. These identifiers are assigned to you when you subscribe to the service. When both are entered correctly, the service's introductory message will appear on the screen. A typical log-on sequence might look like Figure 12-1. In this example, assume that the service previously assigned you the user name **AF9933** and the password **SECRET**.

USING THE TRADE*PLUS SERVICE

Once you have successfully logged onto a Trade*Plus on-line brokerage service, you can begin trading or reviewing securities. When you initially telecommunicate with the service, the first menu that appears will be a main menu like the one in Figure 12-2. There are basically two types of operations you can perform from the

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BUYING AND SELLING STOCKS AND BONDS

While several information services give you the most current news, stock quotes, and historical information on companies and industries, they do not let you buy or sell stocks or other securities (such as IRAs and Keogh accounts) from your Macintosh keyboard. There are, however, brokers who do provide this assistance. Such services let you manage your own portfolio 24 hours a day, 7 days a week, executing financial transactions faster and more reliably than via telephones or “ticker tape.”

In addition to their trading capabilities, on-line brokerage services provide automatic record keeping, news and quotes, itemized schedules of long- and short-term capital gains and losses, summaries detailing portfolio values and security yields, transactions in cash or margin accounts at market order or limit order, and many other services. If you place an order while stock exchanges are open, the order is executed immediately. When you place an order and exchanges are closed, the order will be executed as soon as the market opens.

Stockbrokers offering home portfolio management include Texas Securities, Inc., in Fort Worth; C.D. Anderson, Inc., in San Francisco; and Fidelity, Inc., in Boston. All three brokers use a variation of the Trade*Plus program offered by Trade*Plus, Inc., of Palo Alto, California. When you use your Macintosh and a regular telecommunications program (such as MacTerminal) to dial one of these

Following the instructions in the *Dow Jones User's Guide*, you can then type in an industry code to get the latest news headlines. (See the *Dow Jones News/Retrieval Operating Guide and Directory of Symbols* for a list of the codes.)

For example, if you are interested in news about the paper industry—code I/PUL—type **I/PUL 01** and press RETURN. Dow Jones will respond with such headlines as

```
DM 06/24 U.S. WANTS CANADA TO END LUMBER
      (DW) SUBSIDIES
DN 06/22 SUPERIOR ANNOUNCES PRICE HIKE
      (WJ) ON NEWSPRINT
```

Since you want to know about anything having to do with Superior (especially a price hike), type **DN** (the index code in the left column) and press RETURN. The story that accompanied the headline will begin scrolling on your Macintosh screen.

LOGGING OFF DOW JONES

When you have the information from Dow Jones that you need, log off the service by typing **DISC** and pressing RETURN. You will then be in MacTerminal's terminal mode and you can exit the program.

OTHER SERVICES

CompuServe and The Source also offer financial information. CompuServe, for instance, offers Standard and Poor's data, MicroQuote, and Quick Quote, among other financial databases. Check your information service user's guide for details.

If you want to buy and sell stocks or perform other financial transactions, several stockbrokers across the nation provide telecommunication facilities. See Chapter 12 for a discussion of these services.

been doing, type **.SUP** and press RETURN; Dow Jones will list any news stories about the company in the last 30 days. You might want to download this information for your records.

At this time, you can request more data on Superior Paper or a quote on a different company, or return to the master menu by typing **//MENU** and pressing RETURN.

Getting Business and Industry News

Dow Jones isn't limited to information on particular companies; you can get general news about an industry as well. To do so, return to the master menu (by typing **//MENU** and pressing RETURN).

From the master menu, select option A by typing **A** and pressing RETURN. A menu like that in Figure 11-6 will appear.

If you want the Dow Jones News, type **//DJNEWS** and press RETURN; Dow Jones will display the message

```
DOW JONES NEWS IS BEING ACCESSED
ENTER QUERY
```

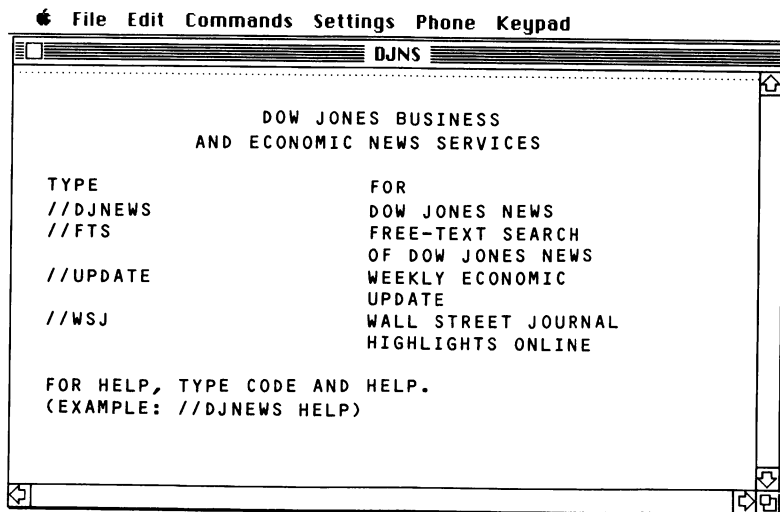


Figure 11-6. *Dow Jones Business and Economic News menu*

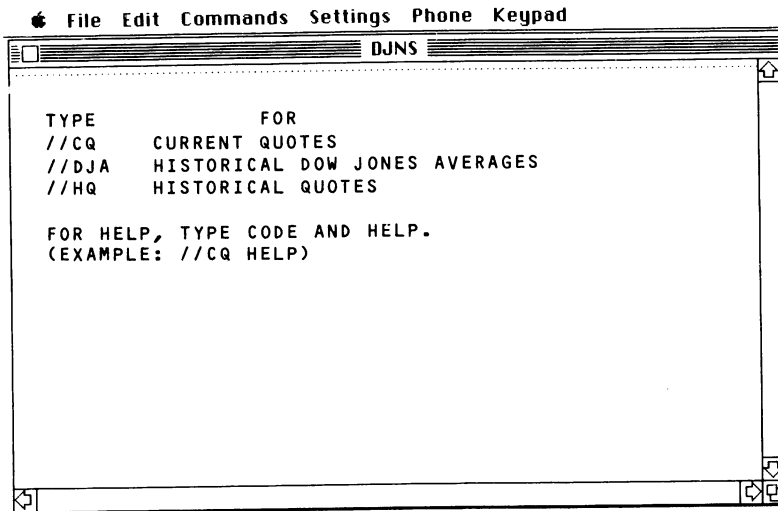


Figure 11-4. A Dow Jones stock information menu

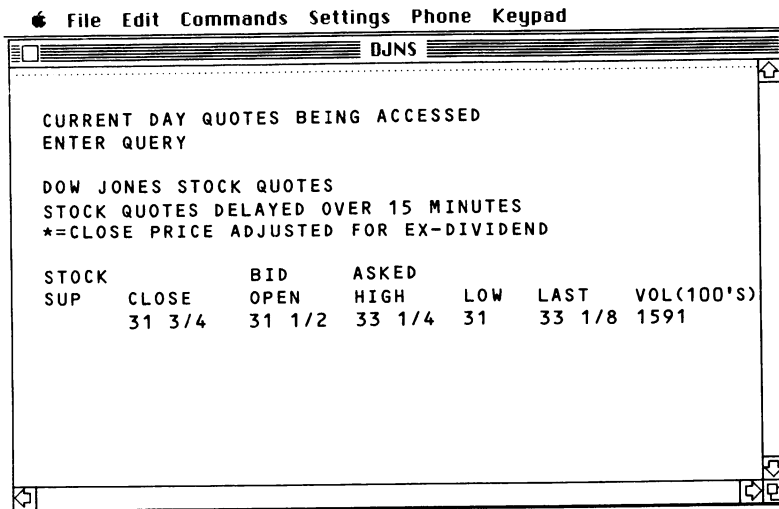


Figure 11-5. Dow Jones stock information on a company

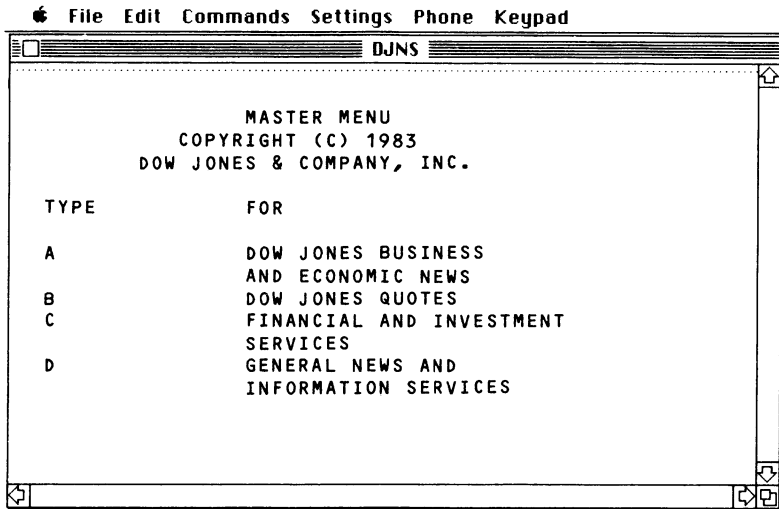


Figure 11-3. *The Dow Jones master menu*

Getting Stock Quotes and Company News

For stock information, select option B by typing **B** and pressing RETURN. Dow Jones will prompt you with a menu like that in Figure 11-4.

To check on current stock quotes, type **//CQ** and press RETURN. Dow Jones will respond with the message

```
CURRENT DAY QUOTES BEING ACCESSED  
ENTER QUERY
```

To get the current quote on a particular stock, type a comma (,) and the company symbol and press RETURN. (For a complete list of company symbols recognized by Dow Jones, see your copy of *Dow Jones News/Retrieval Operating Guide and Directory of Symbols*.)

For example, if you hold stock in Superior Papers (a fictitious company) and want to find out how your investment is doing, type **,SUP** and press RETURN. Dow Jones will respond with a message similar to that in Figure 11-5.

If you want additional news (not just stock quotes) on how Superior Paper has

LOG IN: Type **DOW1;** but do not press RETURN. (Notice that the second semicolon is not displayed.) Next the message **HOST IS ONLINE** will appear.

This means you've established communication. When prompted **WHAT SERVICE PLEASE????**, you should type **DJNS** and press RETURN. Telenet will transfer you to Dow Jones, and you'll be prompted to **ENTER PASSWORD**. Enter the password you were assigned when you subscribed to Dow Jones (for instance, **SECRETSTAR**) and press RETURN. Notice that the password is not displayed on the Macintosh screen as you type.

The entire procedure should look something like Figure 11-1.

USING DOW JONES

Once you've logged onto Dow Jones, you'll be presented with a screen that looks like the one in Figure 11-2. If you want to get down to business, type **MENU** and press RETURN.

The Dow Jones master menu will then appear, allowing you to look up stock quotes or any of the information Dow Jones provides. (See Figure 11-3.)

No matter where you are in the service, you can always type **//MENU** and press RETURN to return to the master menu.

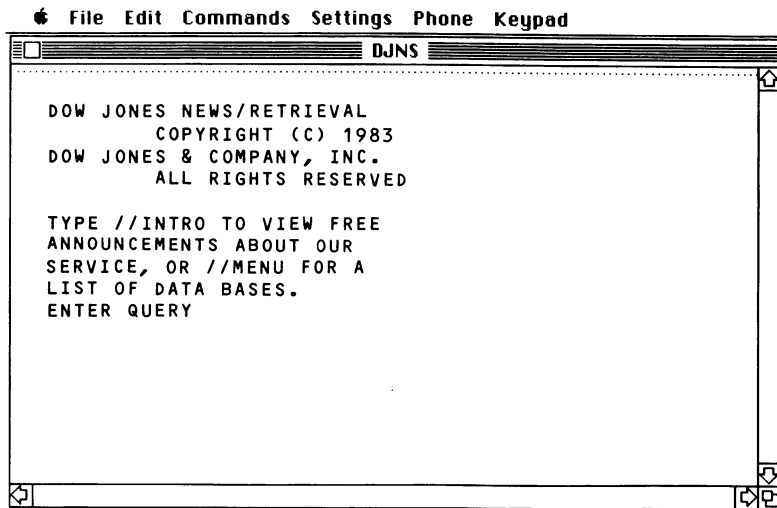


Figure 11-2. *The initial Dow Jones screen display*

service: full-duplex, XON/XOFF disabled (off), and even parity. See Chapter 4 for details.

LOGGING ONTO DOW JONES

Depending on your geographical location, you may have to log onto Dow Jones via the Tymnet or Telenet network services. The following section will use Telenet to demonstrate how to log onto Dow Jones. For your local network telephone number, see the directory provided by Dow Jones when you subscribe to the service.

To begin, dial the Telenet number. You'll then be communicating with Telenet. However, you won't yet be on-line with Dow Jones.

The next prompt you will see looks something like this:

```
PLEASE TYPE YOUR TERMINAL IDENTIFIER
-3775-022-
```

Simply type **A**—do not press RETURN—and you will be prompted **PLEASE**

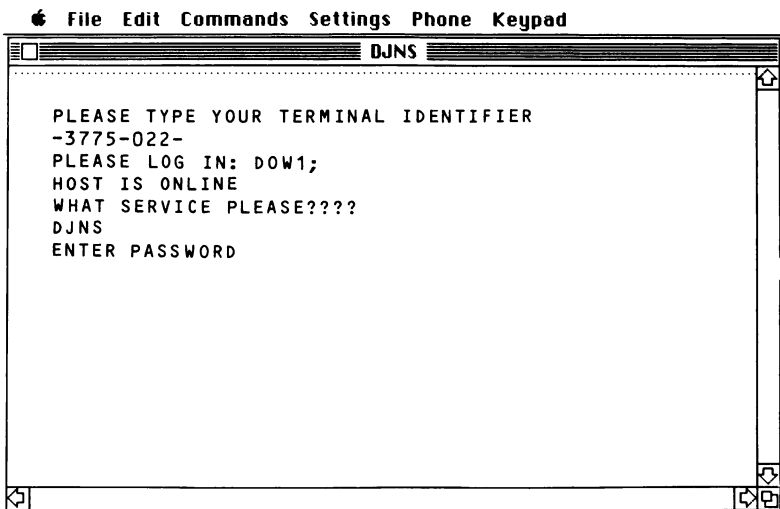


Figure 11-1. *Logging onto Dow Jones*

11

GETTING STOCK QUOTES

Anyone who invests in stocks or bonds, whether casually or seriously, needs to keep track of the latest business news and current stock quotes. Sometimes yesterday's quotes aren't good enough, even though they're listed in today's *Wall Street Journal*. Furthermore, the most up-to-date information about companies, industries, and the economy is essential.

When connected to a telephone, a Macintosh can provide the most recent information about companies and their stocks. All that is needed is the telephone number of the Dow Jones News/ Retrieval service and a password. The Dow Jones service provides current market quotes on all stocks, bonds, and options traded on the major stock exchanges. Also available are quotes on selected U.S. Treasury issues and business news from the *Wall Street Journal*, *Barron's*, and the Dow Jones News Service. Information (some of it historical) on more than 3000 companies and an electronic encyclopedia are offered by Dow Jones as well.

You can become a Dow Jones subscriber by contacting the service directly (see Chapter 4 for details). You can also gain access to Dow Jones information by joining one of the many other information services, such as MCI Mail. If you are an MCI Mail member (see Chapter 8), dial your MCI access number and log onto the system. When the MCI command prompt appears, type **DOWJONES** and you will be on-line with the Dow Jones News Service.

Before using MacTerminal to communicate with the Dow Jones service, you must set the communications protocol to match that of the information

ACCESSING THE TRAVEL SHOPPER

The Travel Shopper service, sponsored by CompuServe and Trans World Airlines, goes one step further than the OAG. Not only can you view the schedules and fares for hundreds of worldwide flights, you can also make airline reservations from your Macintosh keyboard.

To get to the Travel Shopper from the CompuServe main menu, type **GO TWA** and press RETURN when the CompuServe command prompt **!** is displayed. At that time you can become a Travel Shopper member by filling out the appropriate enrollment form. Members can book airline reservations in addition to viewing schedules and fares; non-members can only view schedules and costs. While membership itself is free, access time to reserve tickets is between \$20.00 and \$40.00 per hour depending on whether you call during prime-time or non-prime-time hours.

Once you have identified a flight on which you wish to reserve a seat, follow the on-line instructions to make the booking. You can specify whether you want to pick up the ticket at a travel agent, at the airline desk, or simply have it mailed to you.

OTHER TRAVEL INFORMATION SERVICES

The Source's Travel Club provides not only airline fare information and schedules, but also information on hotel reservations. Like CompuServe's Firstworld, the Travel Club is an electronic mail service; it is an independent agency that provides a travel service for The Source. After logging onto The Source, you communicate your travel plans to the Travel Club by electronic mail. A Travel Club representative reads the mail and makes the reservations for you; then you mail a check directly to the Travel Club. In addition, you can use the Travel Club to make hotel and rental car reservations and to get special travel tips and alerts for the areas in which you plan to travel.

Also available on The Source are the Mobil Travel Guides, which offer information about more than 6000 restaurants in 1800 North American cities; and Mobil Travel Services, which offer information — such as rates and availability of facilities — about thousands of U.S. and Canadian hotels.

You may be interested in the \$195 fare, but the asterisk tells you there are limitations. To find out what they are, type **L3** and press RETURN. OAG will display the information about fare restrictions shown in Figure 10-7. If you don't have three days to wait after picking up your ticket, choose one of the other fares.

When you have gotten all the information you need, you exit the OAG service and return to CompuServe by typing **/Q** and pressing RETURN. Next, to exit CompuServe, you type **BYE** and press RETURN.

FINDING OUT MORE ABOUT OAG

If you're interested in subscribing to OAG or want more information about it, contact:

Official Airline Guides
Electronic Publishing
2000 Clearwater Drive
Oak Brook, IL 60521
Phone: 800-323-3537, ext. 904 (in all states except Illinois)
800-942-1888, ext. 904 (in Illinois)

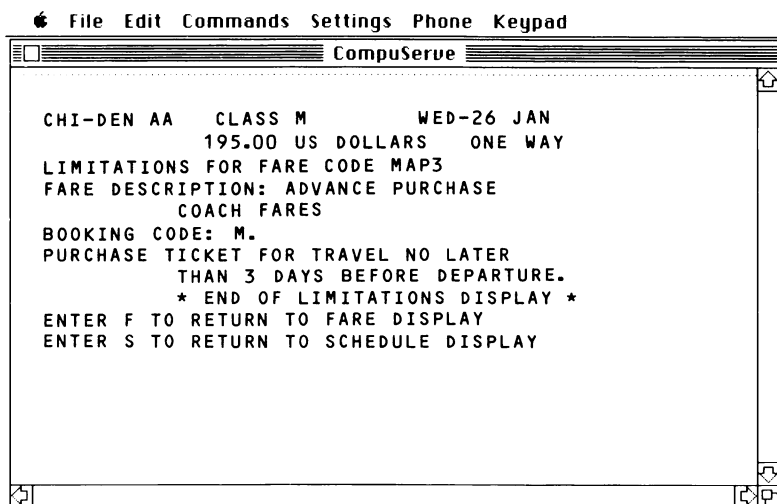


Figure 10-7. Limitations on a specified fare category

```

                DIRECT FLIGHTS                                WED-26 JAN
FROM-CHICAGO,IL,USA
# TO-DENVER,CO,USA
NO EARLIER DIRECT FLIGHT SERVICE
1  570A   ORD  990A   DEN   UA   225   72S   B   0
2  851A   ORD  100A   DEN   OZ   783   D9S   S   1
3  900A   ORD  100P   DEN   AA   279   D9S   L   3
4  1005A  ORD  1118A  DEN   RC   789   D10   B   0
ENTER +,CX,X#,F#,RS (#=LINE NUMBER)
#

```

Depart Time Airport Name Arrive Time Airport Name Airline Flight Number

Figure 10-5. *Display of specified flight information*

displayed in Figure 10-5, you are interested in the 9:00 A.M. flight, line 3. To find out how much it costs, type **F3** and press RETURN. OAG responds with information similar to that shown in Figure 10-6.

```

⌘ File Edit Commands Settings Phone Keypad
CompuServe
FARES IN US DOLLARS                                WED-26 JAN
SELECTED FOR ORD-AA 279 DEN
# ONE-WAY RND-TRIP ARLN/CLASS FARECODE
NO LOWER FARES IN CATEGORY
1* 238.00      AA/B   BE76
2* 249.00      AA/B   BE69
3* 195.00      AA/N   MAP2
4* 244.00 488.00 AA/Y   Y
5* 317.00 634.00 AA/F   F
NO HIGHER FARES IN CATEGORY
* ENTER L# TO VIEW LIMITATIONS
ENTER L#,X#,S,RS(#=LINE NUMBER)

```

Figure 10-6. *Fare information for a specified flight*

asked the following four questions one at a time:

1. What is your departure city?
2. What is your destination city?
3. What is your departure date?
4. What time do you want to leave?

You can answer by typing in the names, dates, and times as follows:

- City names can be typed in full or abbreviated by the official three-character airport code (the one used on airline baggage claim checks to identify destinations, such as DFW for Dallas-Fort Worth Airport).
- Dates must be entered with the day of the month first, followed by a three-letter abbreviation for the month (26 Jan for January 26).
- Times can be in 24-hour or regular format (that is, 3:00 P.M. can be either 1500 hours or 3 P.M.).
- For both time and date, you can enter + and press RETURN and OAG will assume you want to use the current date and 6:00 A.M.

Getting Schedule Information

You need use only one command to get airline schedule information, the /S command. Simply type /S and press RETURN.

OAG will respond **ENTER DEPARTURE CITY NAME OR CODE**. Enter the name of a city or its airport code. You might, for example, enter either **CHICAGO** or **ORD**.

OAG will respond **ENTER DESTINATION CITY NAME OR CODE**. Again enter the name of a city or its airport code. You might, for example, enter either **DENVER** or **DEN**. OAG will then prompt you for the departure date: **ENTER DEPARTURE DATE OR ENTER + TO USE 26 JAN**. (January 26 is simply a sample date; the current date will be used when you log on.) Enter a date, putting the day of the month first, or + for the current date. Finally, OAG will ask you to **ENTER DEPARTURE TIME OR ENTER + TO USE 600AM**. If you enter + and press RETURN, all flights from Chicago to Denver on the entered or current date will be displayed. (See Figure 10-5.)

Getting Fare Information

To find out the fare of a particular flight, enter the /F command followed by the line number of the flight you're interested in. Say, for example, that of the flights

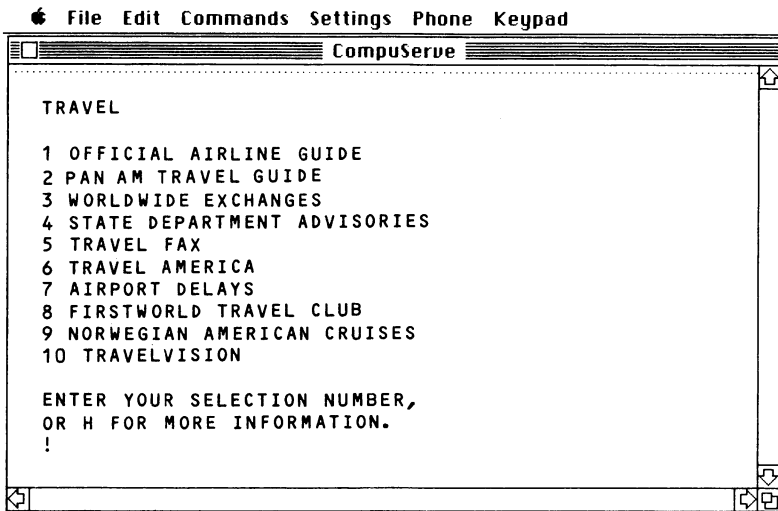


Figure 10-3. *The CompuServe Travel menu*

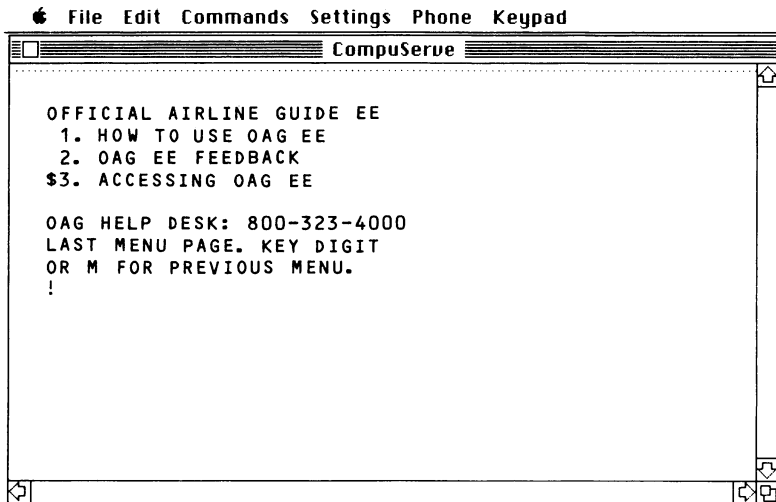


Figure 10-4. *The CompuServe OAG menu*

schedule and fare information, select option 2, Business and Financial, by typing **2** and pressing **RETURN**. You'll then be presented with a menu like the one shown in Figure 10-2.

Select option 7, Travel Services, by typing **7** and pressing **RETURN**; a Travel menu like the one shown in Figure 10-3 will appear. Select option 1, Official Airline Guide. The OAG menu will then appear. (See Figure 10-4.) Option 3 of the OAG menu gives details regarding flights. (The \$ sign indicates that using the option costs extra.)

Once you've selected option 3, OAG will begin with introductory information, which is followed by a prompt. To answer the prompt you need to know only four commands:

- /S to investigate schedule information
- /F to investigate fare information
- /I to get help information
- /Q to quit and return to CompuServe.

If you type either **/S** or **/F**, for fare or scheduling information, you will be

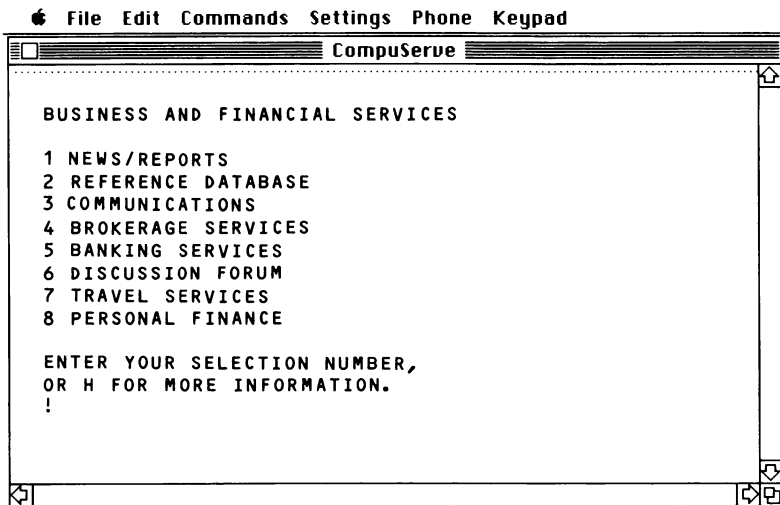


Figure 10-2. *The CompuServe Business and Financial Services menu*

then asked the date and time of day you want to fly. After you respond, a list of all scheduled flights from your point of departure to your destination will appear on the Mac's display. You can also obtain fare information about any flight you specify.

Use of the OAG and the Travel Shopper is not included in your regular CompuServe charges; an additional fee is billed through your CompuServe account. You can also connect to the OAG via Tymnet or Telenet, but each of these requires a special OAG account number and password.

Before beginning your travel session, be sure your Macintosh telecommunications system is set up correctly. See Chapters 2 and 3 for correct hardware and software setup procedures. Chapter 4 provides instructions for logging onto CompuServe.

ACCESSING OAG INFORMATION

Once you've logged onto CompuServe, you'll be presented with a screen similar to that in Figure 10-1. The ! is CompuServe's command prompt, which signifies that the information service is waiting for you to type in something. To access airline

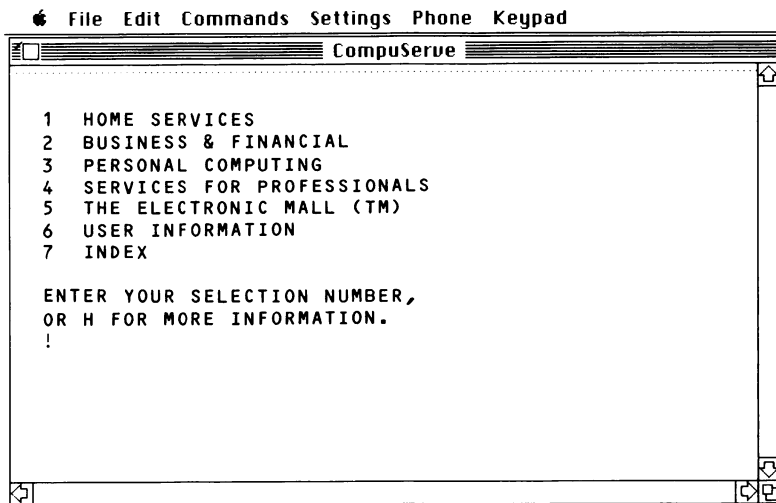


Figure 10-1. *The CompuServe Information Service menu*

AIRLINE SCHEDULES, FARES, AND RESERVATIONS

Whether you are a constant or an occasional traveler, there are times you need to know about airline schedules and fares right away. Of course, you can get your own copy of the airline schedule compendium (a book about the size of a big-city phone directory). However, even the most recent publication is always weeks out of date, for the airlines seem to change schedules daily — if not hourly. Tapping into the airlines' "official" scheduling system provides a better way of keeping up-to-date on the most recent airline fares and schedules.

Your Macintosh telecommunications system provides you with access to airline information through the CompuServe Information Service. The Official Airlines Guide (OAG) and the Travel Shopper allow you to check on schedules and fares for more than 820,000 worldwide flights. Once you have found a flight that suits your needs, you can book your flight electronically through the Travel Shopper.

Before using these services, you might think you have to be a travel agent to understand the scheduling system, but you'll find out otherwise. Both databases are quick and simple to use and can save you both time and money.

With both services you're asked your point of departure. You enter the name of a city or an airport code (just like the ones on baggage tags). Next you are asked your destination. Again, just enter the name of a city or an airport code. You are

In general, BRS costs more than Knowledge Index, but the information is probably worth the extra cost if you're doing research of a highly technical nature. And like Knowledge Index, BRS can be accessed through either Tymnet or Telenet. To find out more about BRS, contact:

Bibliographic Retrieval Services
1200 Route 7
Latham, NY 12110
Phone: 800-833-4707

general subject area of your topic. When Knowledge Index prompts you, ?, to let you know that you can request information, the general procedure is to

1. Tell Knowledge Index to begin a section (by typing **BEGIN**) from one of the following nine general subject areas listed in the literature you receive when you subscribe to Knowledge Index:

Agriculture
Business information
Computers and electronics
Corporate news
Education
Engineering
Government publications
Magazines
Medicine.

For example, to find out information pertaining to education, type **BEGIN EDUCATION** and press RETURN.

2. Tell the service to find (by typing **FIND**) a more specific topic. Knowledge Index will then tell you how many articles are filed on that topic. For example, type **FIND ELEMENTARY EDUCATION** and press RETURN.
3. Tell Knowledge Index to display (by typing **DISPLAY**) one of the articles (each article is identified by a code). For instance, type **DISPLAY S1** and press RETURN.
4. To exit Knowledge Index, simply type **LOGOFF** when the ? prompt is displayed (at the end of the article).

If you're interested in subscribing to Knowledge Index, you can send for a brochure outlining the services it offers. Write to:

Knowledge Index
Dialog Information Services, Inc.
3460 Hillview Avenue
Palo Alto, CA 94304
Phone: 800-528-6050, ext. 415 (in all states except Arizona)
800-352-0458, ext. 415 (in Arizona)

BIBLIOGRAPHIC RETRIEVAL SERVICES (BRS)

Bibliographic Retrieval Services (BRS) offers information in such areas as science and medicine, business and finance, reference, education, the social sciences and humanities, and energy and environment.

communications protocol is also the same, although the specific software requirements may be different. See the Knowledge Index literature for details.

Once the hardware and software are set up, the Macintosh and Telenet should be ready to “talk” to each other. When the connection is completed at the other end, press RETURN to establish it. The following message from Telenet will appear: **TELENET 817 19E**. (In this message, 817 19E is a sample code; the actual code will vary according to the location you are calling from.)

Next Telenet will display the message **TERMINAL =**. In response to this prompt, simply press RETURN. After a brief pause, Telenet will send you the message **@**. You can then specify that you want the Knowledge Index service by typing **C 41548K** and pressing RETURN.

Knowledge Index will prompt you for your account number and password (assigned when you subscribed). Enter them and press RETURN. If you make a mistake while entering either the account number or password, Knowledge Index will tell you so and ask you to repeat the procedure. The results of the entire procedure should look something like Figure 9-6.

Once on-line with Knowledge Index, you'll be able to search thousands of articles in just a few minutes. To sift through them, all you have to know is the

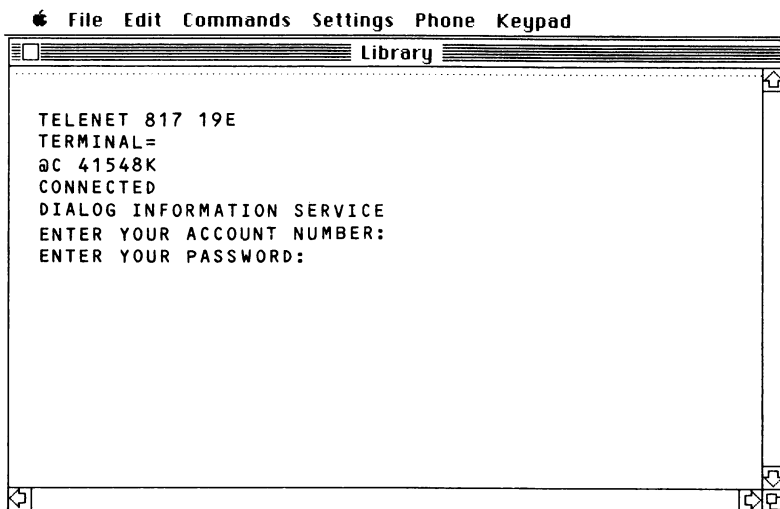


Figure 9-6. Knowledge Index log-on sequence via Telenet

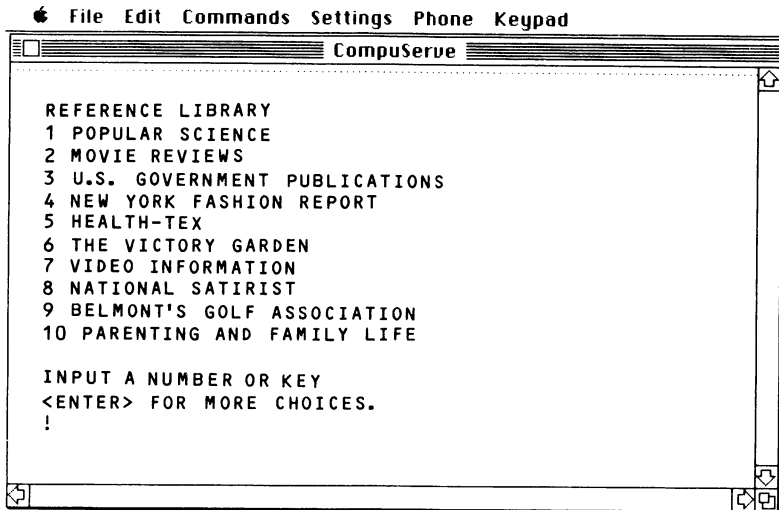


Figure 9-5. *Reference Library main menu*

OBTAINING RESEARCH INFORMATION FROM KNOWLEDGE INDEX

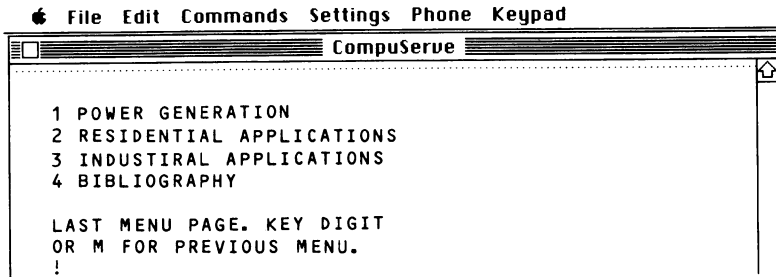
CompuServe isn't the only information service providing reference material. Other services offer extensive reference material for high schools, colleges and universities, and business. However, they have fewer hours of access than CompuServe and are therefore not as convenient, and they are costlier to use.

One such service, the Dialog Information Service, offers the Knowledge Index, a reference source with over 4 million summaries of books, magazine articles, and reports on business, technology, science, current events, and other topics. To keep service costs to a minimum, Knowledge Index is available only in the evenings and on weekends.

Unlike many information services, Knowledge Index does not have its own telephone network; it must be accessed via a local Tymnet or Telenet phone number. When you subscribe to Knowledge Index, you'll be provided with a directory of local Tymnet or Telenet phone numbers.

You make the same hardware connections (that is, phone connections) to communicate with Tymnet or Telenet as you do for CompuServe. Setting the

energy. When you are finished reading press RETURN, and another menu, similar to the following, will appear:



Since you are primarily interested in solar energy use in homes, select option 2, Residential Applications, by typing **2** and pressing RETURN. An article on that topic will appear. After that, another menu, like this one, will be displayed:

```
1 ACTIVE SYSTEMS
2 PASSIVE SYSTEMS

LAST MENU PAGE. KEY DIGIT
OR M FOR PREVIOUS MENU.
!
```

After you have all the information you need, type **M** and press RETURN. You might then begin searching for other sources of solar energy information.

If you want to look up magazines and other periodicals, return to CompuServe's Home Services menu (shown in Figure 9-2) and select option 2, Reference Library, by typing **2** and pressing RETURN. A list of available publications like that in Figure 9-5 will be displayed.

Since *Popular Science* magazine regularly carries articles concerning solar energy, you might select option 1 (by typing **1** and pressing RETURN). In this case, you will be able to obtain three articles on solar energy—one on a solar house, another on solar energy applications in an urban environment, and a third on solar hot-water heaters. You could then return to the Reference Library main menu (see Figure 9-5) and select option 3, U.S. Government Publications, where "Energy Conservation" might be one of the topic categories; choosing this option produces three government pamphlets about solar energy.

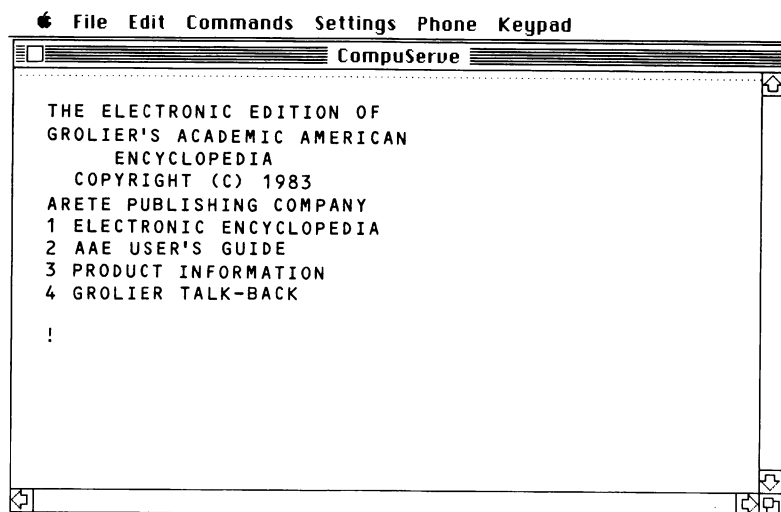
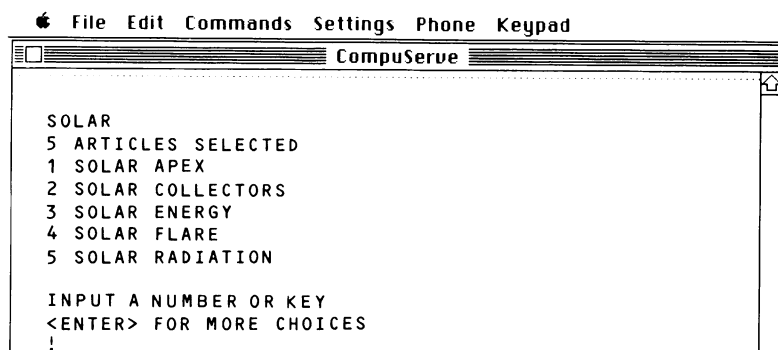


Figure 9-4. *Encyclopedia menu*

identifying the topic. For instance, if you are researching solar energy, you might type **SE SOLAR** and press RETURN.

The encyclopedia will display a list of available articles like this:



By selecting option 3, Solar Energy, you can read a general article on solar

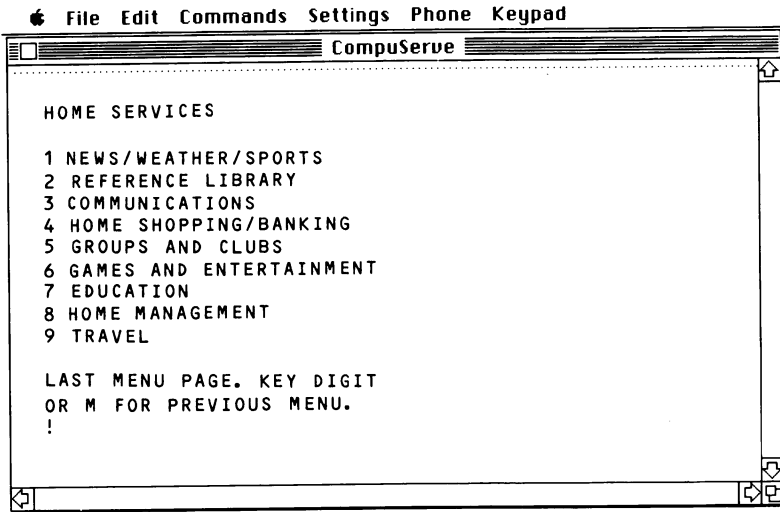


Figure 9-2. Home Services menu

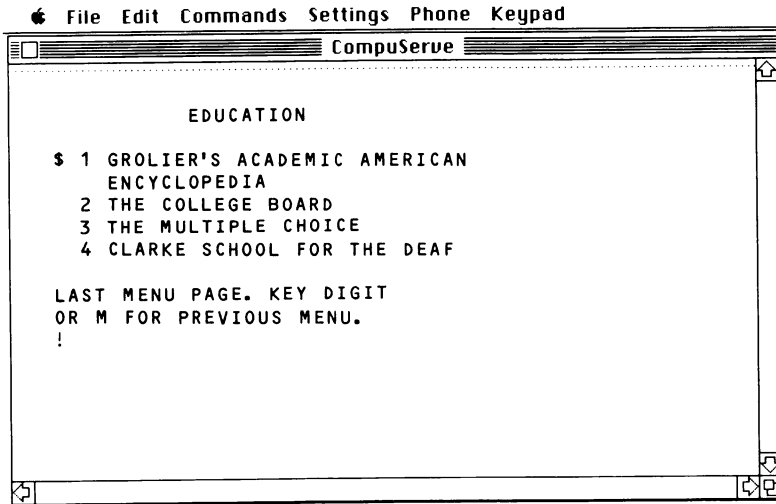


Figure 9-3. CompuServe's Education menu

Grolier encyclopedia provided by CompuServe contains more than 9 million words and 30,000 entries. Cross-referencing is fast and easy, and complete bibliographies list other relevant publications for further research. Furthermore, you can store the research material as you receive it. You can then use a word processing program to merge the material with other pertinent information as you write the report on paper.

For starters, select option 1, Home Services, from the CompuServe main menu shown in Figure 9-1. The Home Services menu will appear (Figure 9-2).

To use the encyclopedia, select option 7, Education, by typing 7 and pressing RETURN, and CompuServe will take you to the Education menu. (See Figure 9-3.) (The \$ sign indicates that an additional fee is charged for using the option.)

To get to the encyclopedia, next select option 1, Grolier's Academic American Encyclopedia, by typing 1 and pressing RETURN. You'll be presented with a menu similar to that in Figure 9-4. If you want information on how to use the encyclopedia, select option 2, AAE User's Guide. Otherwise, begin researching a topic by selecting option 1, Electronic Encyclopedia.

When the ! prompt is displayed, you can begin searching the encyclopedia for a particular topic. Type in the SE (for "search") command followed by a word

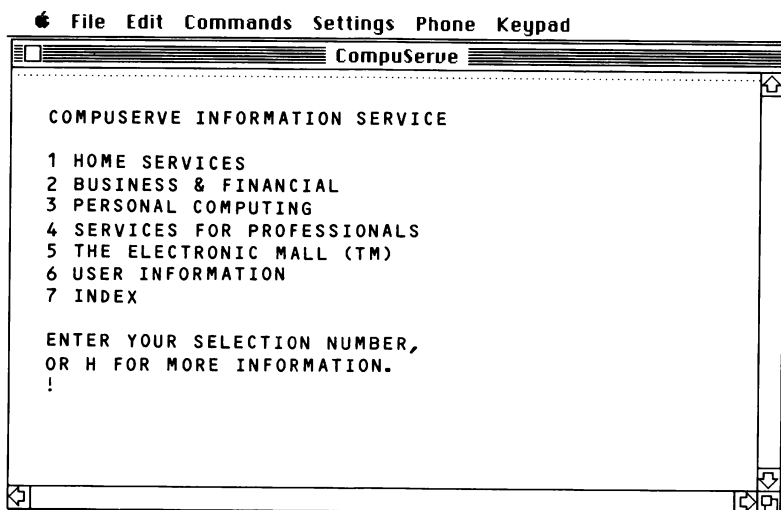


Figure 9-1. *CompuServe main menu*



USING COMPUTERIZED LIBRARIES

Getting to the library isn't always convenient or even possible. The library may not even have the information you need. Not getting the information you want is a nuisance if you are researching a topic for general interest; if you are a student writing a term paper, it can be detrimental to your grade.

Once you begin telecommunicating with your Macintosh, you will probably be able to locate most of the resources you will ever need, everything from an encyclopedia to the contents of thousands of periodicals.

There are many different sources of computerized research material. CompuServe provides a variety of resources, including periodicals and encyclopedias. Databases like Knowledge Index and BRS After Dark provide more detailed information.

OBTAINING RESEARCH INFORMATION FROM COMPUSERVE

Why would you want to use CompuServe's encyclopedia rather than the one on the library shelf? For one reason, the library copy may be less up-to-date—a real handicap in many fields of knowledge—and smaller and less comprehensive. The

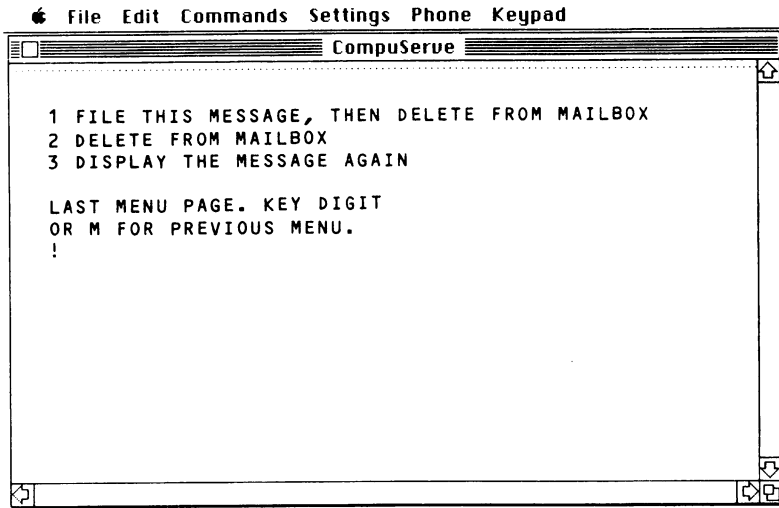


Figure 8-15. *A CompuServe Electronic Mail options menu*

- Option 1 deletes the message from the display but stores it in CompuServe's computer for about a month in case you need to see it again.
- Option 2 deletes the message forever.
- Option 3 displays the message again.

If you need to leave a message for another person, return to the Electronic Mail main menu by typing **M** and pressing RETURN. You can then go through the procedure for composing and sending mail.

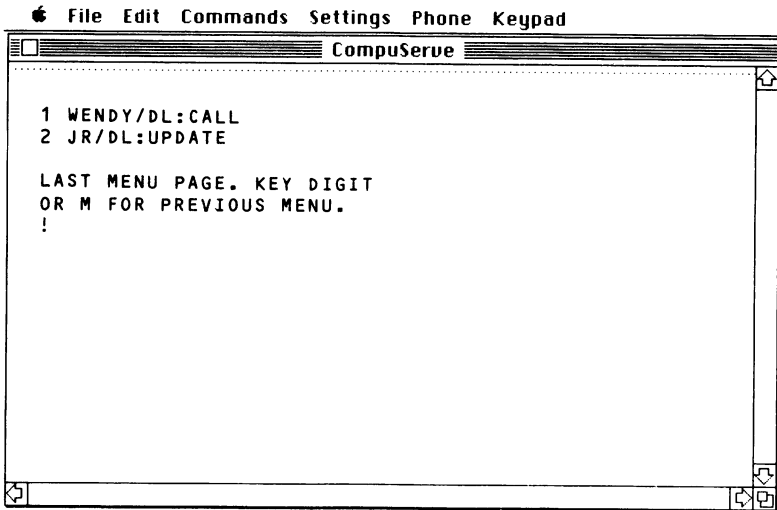


Figure 8-14. *A list of messages identifying senders and subjects*

By selecting option 1, Read Mail, you can get various kinds of information, as shown in Figure 8-14.

- A list of all messages sent to you
- The name of each person who sent a message
- The subject of each message.

You can select the message you want to read by typing the appropriate number and pressing RETURN. The message will then appear on your Macintosh display. At the top of the display will be the time and date the mail was sent so it doesn't get mixed up with other letters.

Storing or Throwing Away EMAIL

When you press RETURN, a menu similar to Figure 8-15 appears. After you have typed 1, 2, or 3, the specified operation is performed.

you're sure the message is correct, type **6** and press RETURN to send it.

Before your message is sent, however, you'll be asked the user ID of the person you are sending it to. (See Figure 8-13.) Next you'll be asked the subject matter. In the previous example, it might be DL:CALL for "Dave Lammert: Call Me." Finally, you'll be asked to give your name. You can enter your name or initials. (Refer again to Figure 8-13.)

CompuServe will give you one final chance to be sure the information is correct. If you answer **YES** or **Y**, the mail is sent. Note that it can take as long as 20 minutes to process the letter.

Reading EMAIL Letters

Like most electronic mail systems, CompuServe notifies you when someone has sent you an electronic letter as soon as you log onto the system. Instead of displaying the main menu, the message **YOU HAVE EMAIL WAITING** appears. The information service then automatically takes you to the Electronic Mail main menu. (See Figure 8-11.)

The screenshot shows a terminal window titled "CompuServe" with a menu bar containing "File", "Edit", "Commands", "Settings", "Phone", and "Keypad". The main text area displays the following prompts:

```

KEY <ENTER> TO LEAVE; ? FOR HELP
SEND TO USER ID: 70007,912
SUBJECT?          (32 CHARACTERS MAX)
:DL:CALL
YOUR NAME?        (32 CHARACTERS MAX)
:WENDY
(12 CHARACTERS)
  
```

The window has a standard Mac OS-style border with a scroll bar on the right and a status bar at the bottom.

Figure 8-13. *Input needed before a message is sent*

Writing and Sending EMAIL Letters

If you're sending messages, select option 2, Compose and Send Mail. Several options like those shown in Figure 8-12 will then be presented.

To compose short memos, select FILGE (short for "File Generator") by typing **1** and pressing RETURN. The CompuServe file number for your letter will appear at the top of the screen. *This number is for CompuServe's reference only*; it need not concern you. You can now type any message you want. For instance, you might type the following:

8:30 PM

DAVE

GOOD TO HEAR FROM YOU THE OTHER DAY. GIVE ME A CALL AT 212-555-3341 AT 10:00 EST ON 10/13/83.

WENDY

Once you're satisfied that the message is complete, type **/EX** and press RETURN and you will exit to the Electronic Mail main menu shown in Figure 8-11. Then, if

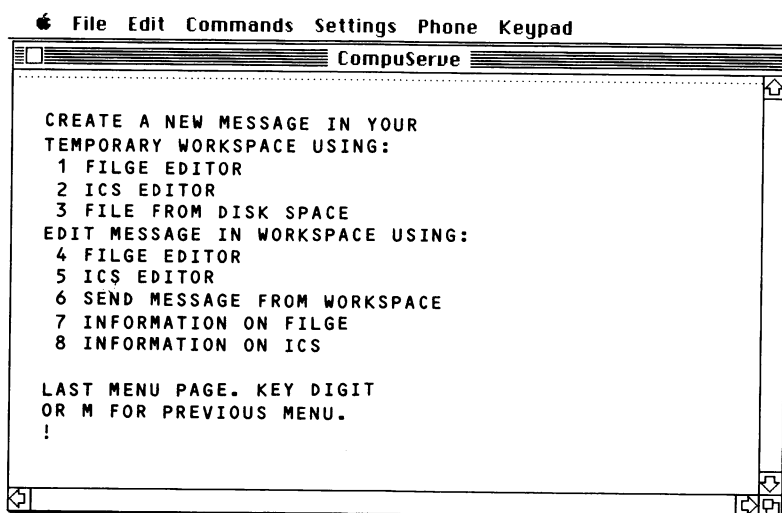


Figure 8-12. *A CompuServe Electronic Mail options menu*

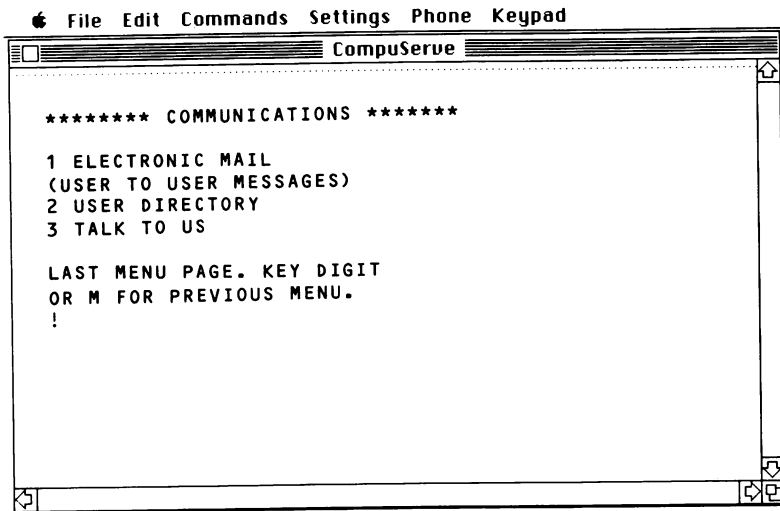


Figure 8-10. The CompuServe Communications menu

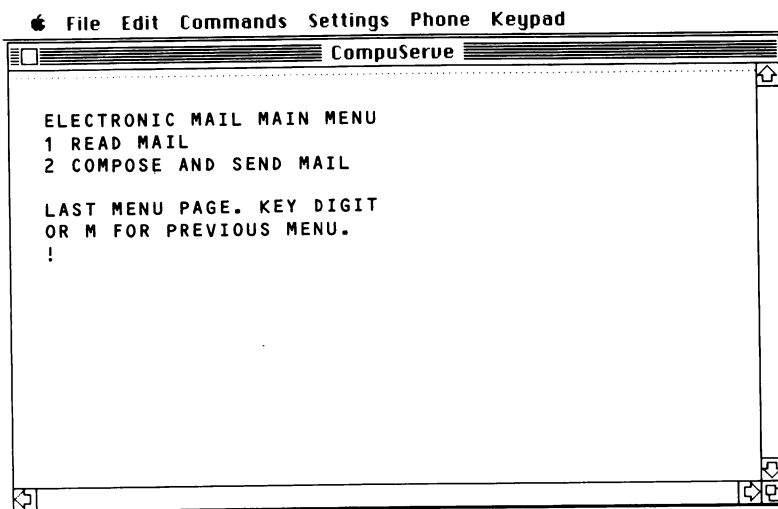


Figure 8-11. The CompuServe Electronic Mail main menu

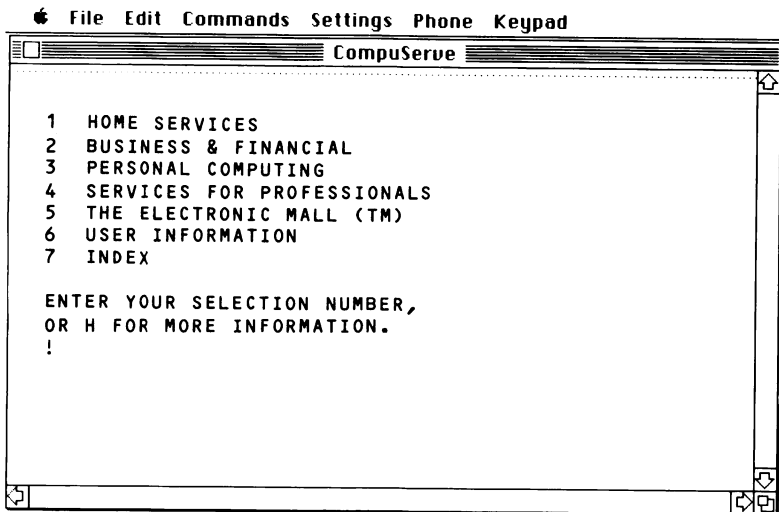


Figure 8-8. *The CompuServe Information Service menu*

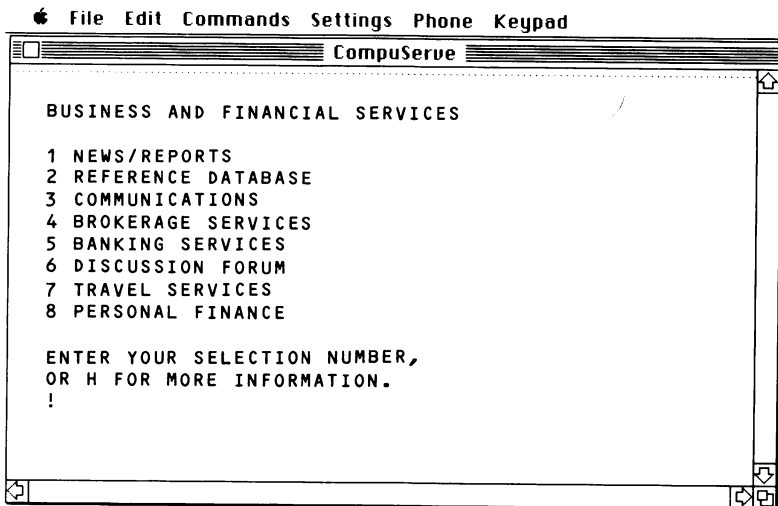


Figure 8-9. *The CompuServe Business and Financial Services menu*

Finding Out More About MCI Mail

If you want to find out more about MCI Mail, contact the service at

MCI Mail
2000 M Street, NW
Washington, DC 20036
Phone: 202-293-4255

COMPUERVE'S EMAIL

CompuServe's EMAIL is fairly typical of electronic mail services offered by general-purpose information utilities. It allows you to compose, edit, and send electronic mail to other CompuServe subscribers and to read and store the electronic messages sent to you.

Except for normal on-line connect charges, sending and receiving EMAIL is free. Since you pay for on-line time, it is more economical to write letters off-line and then use MacTerminal's upload features to mail the letter. You should keep in mind, however, that the maximum length of a letter in EMAIL is 4000 characters. If you try to send a longer document, the service will instruct you to shorten the message. The maximum number of letters that can be sent to one user at a time is 20.

Accessing Electronic Mail

Once you've logged onto CompuServe, you'll be presented with CompuServe's main menu, similar to the one shown in Figure 8-8. The ! is CompuServe's command prompt, which signifies that the information service is waiting for you to type in something. To write, send, or read an electronic memo, first select option 2, Business and Financial, by typing **2** and pressing RETURN. Another menu, like that in Figure 8-9, will appear. Next select option 3, Communications, from this menu by typing **3** and pressing RETURN. CompuServe will then send another menu screen, similar to the one shown in Figure 8-10. Select option 1, Electronic Mail, by typing **1** and pressing RETURN. A brief description of EMAIL will then be displayed, followed by another menu. (See Figure 8-11.) You are ready to use the electronic mail system.

You may enter:

READ	to review your letter
READ PAPER	to review your letter for paper
EDIT	to correct your letter
SEND	U.S. Mail for paper; instant electronic delivery
SEND ONITE	OVERNIGHT courier for paper;
	PRIORITY electronic delivery
SEND 4HOUR	FOUR-HOUR courier for paper;
	PRIORITY electronic delivery
HELP	for assistance

Command (or MENU or EXIT):

Figure 8-7. *MCI Mail Send menu*

the options, just enter the appropriate command (the left-hand column in Figure 8-7) and press RETURN.

To send the letter in Figure 8-6, for example, you would type **SEND** and press RETURN. A message indicating the date and time the message is sent will then be displayed.

```
One moment please; your message is being posted.
Your message was posted: Sat May 19, 1984 12:38 pm PST.
Press <RETURN> to continue
```

When you press RETURN, the MCI main menu will reappear. You can then write another letter, read your mail, sign onto Dow Jones, or exit the system. To log off the MCI system, just type **EXIT** and press RETURN. This sign-off message will appear:

```
Call clearing requested by remote source.
```

Although you have logged off, you will not be completely disconnected from the service; consequently, the MCI Mail's initial prompt (asking for your user name and ID) will reappear. If you want to log back onto the service, enter the correct information. If you do not disconnect the phone or log back onto the service, MCI will hang up its phone after two minutes.

you don't want to send a copy, just press RETURN and the **SUBJECT:** prompt will appear. If you don't want to identify the letter for your records, press RETURN to begin entering the letter.

ENTERING THE LETTER

Once you have addressed the "envelope," the prompt **TEXT:(TYPE / ON A LINE BY ITSELF TO END)** will appear and you can begin entering the letter. If you are typing the letter while on-line, simply type as you normally would. However, if you have previously written the letter and saved it on disk, you will be ready to upload it from the clipboard or a disk file to the service.

The way you indicate the end of the letter (after you have signed your name) is the same: press RETURN, type / and press RETURN again. A complete MCI Mail message might look like the one in Figure 8-6.

Sending an MCI Mail Letter

Once you have indicated that your letter is complete by typing / and pressing RETURN, the MCI Mail Send menu will appear. (See Figure 8-7.) From this menu you can read and make changes to messages before sending them. To select any of

Command (or MENU or EXIT): CREATE

T0: Marvin Davis
 (Marvin Davis not found. Enter a postal or TLX: (telex address), type HELP, or press RETURN to delete.)
 Box 342
 Rte. # 3
 Peterborough, NH 32084

T0:
 CC:
 Subject: Birthday
 Text: (Type / on a line by itself to end)

Dear Marvin,

Just a note to say happy birthday! Don't look at it as if you are getting older. Just tell yourself that you aren't getting any younger.

As always,
 Pat
 /

Figure 8-6. *Entering an MCI Mail letter to a nonsubscriber*

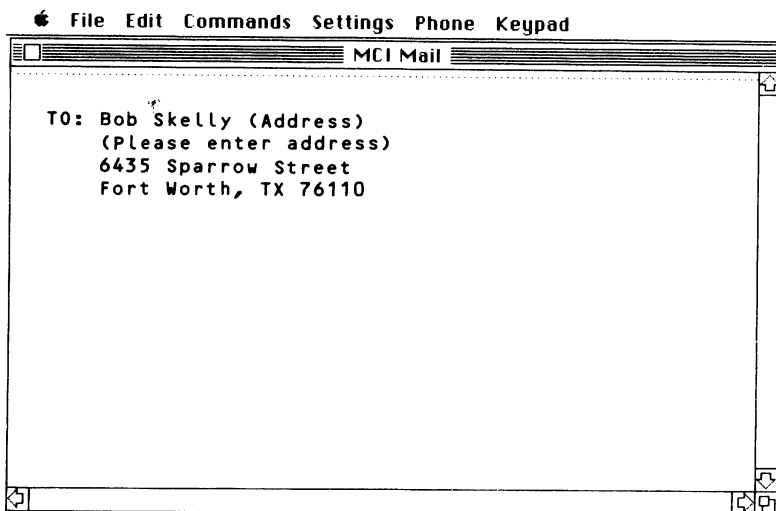


Figure 8-4. *Printed letter to be sent via first-class mail to another MCI Mail subscriber*

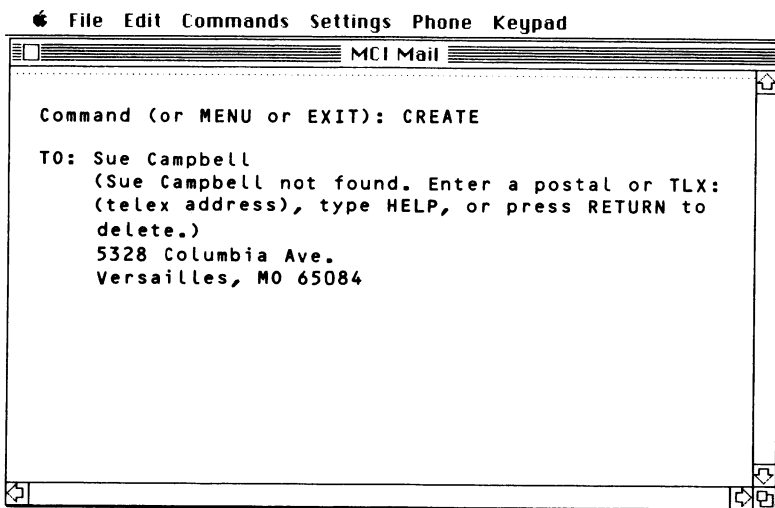


Figure 8-5. *MCI Mail letter addressed to a nonsubscriber*

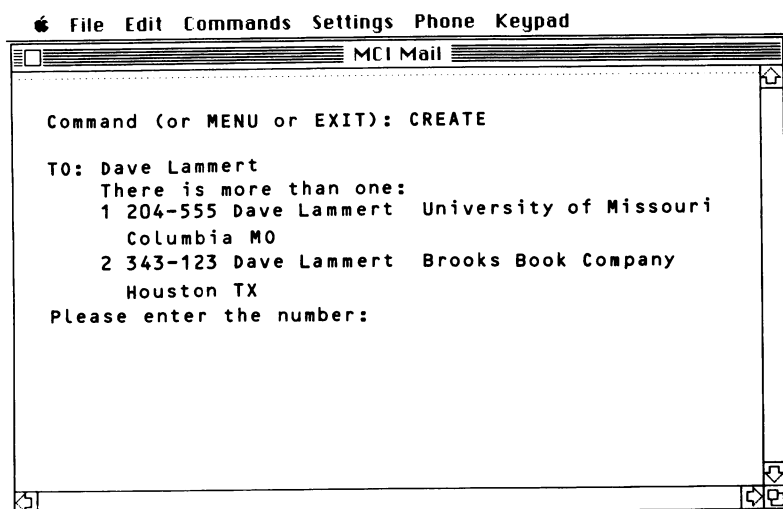


Figure 8-3. *Selecting the correct Instant Letter recipient when more than one MCI Mail subscriber has the same name*

name you typed in. If this situation occurs, the name, address, and MCI ID of all subscribers who have that name will be listed, and you can choose the correct addressee. (See Figure 8-3.) You simply enter the number listed in the left-hand column and press RETURN. For example, type **1** and press RETURN to select Dave Lammert at the University of Missouri. (See Figure 8-3.)

If you want a printed version of the letter sent via first-class mail to another MCI Mail subscriber, enter the addressee's name and then type "**(Address)**" before pressing RETURN. (See Figure 8-4.)

In many instances, you will want to send letters to people who aren't MCI Mail subscribers. These letters are either delivered by first-class mail or by courier (overnight or four-hour delivery). When you enter the name of an addressee who is not an MCI subscriber, the service will search its database and tell you that the person is not registered; you will then be prompted to enter a mailing or telex address as illustrated in Figure 8-5.

Once you have identified the addressee (including the mailing address), the **TO:** prompt will reappear, giving you the option of sending the same letter to another person. Follow the same procedure, or press RETURN to display the next prompt—**CC:**. This lets you send a "carbon copy" of the letter to someone else. If

and edited while on-line with the MCI system. In any case, letter writing begins when you select the Create option from the main menu. To select this option, simply type **CREATE** and press RETURN at the MCI command prompt. MCI will then ask you to address the “envelope.”

ADDRESSING THE ENVELOPE

When you select the Create option from the main menu, the first prompt that appears is **TO:**. At this prompt, you must identify the person to whom you are writing. Enter that person’s name the way you want it to appear on the envelope. For instance, type **Dave Lammert** and press RETURN. The MCI system will check its database to see if the person (that is, the addressee) is also an MCI subscriber.

If the addressee is a subscriber to MCI Mail, the service will display the person’s name and address below the name you entered. This is to be sure that the letter is addressed to the correct person. In such a case, MCI will assume that you want an Instant Letter (which you will enter later) to be automatically sent to that person’s computer. The procedure might look like Figure 8-2.

In some cases, there may be more than one MCI Mail subscriber who has the

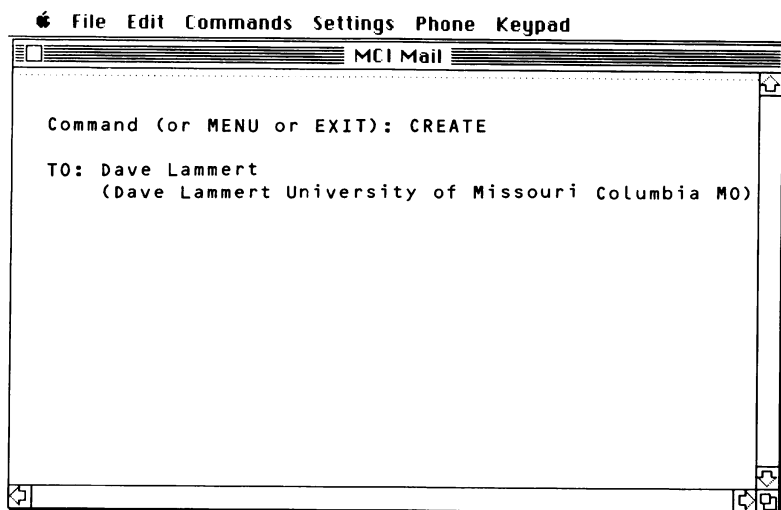


Figure 8-2. *Instant Letter addressed to another MCI Mail subscriber*

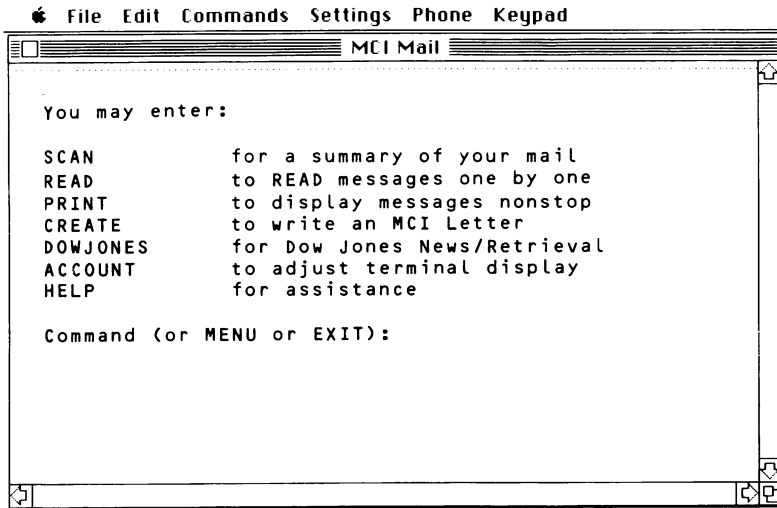


Figure 8-1. MCI Mail main menu

To change the line width, type **LINE** and press RETURN. MCI will respond with the prompt **PLEASE ENTER THE LINE LENGTH:**. You might want to use 39 characters per line. This allows for 39 characters plus the character return code on each line; therefore, type **39** and press RETURN. MCI will then ask if you want to change another setting. If not, just press RETURN. Finally, the service will ask **Are Settings PERManent or TEMPorary:**. If you select "permanent" by entering **PERM**, the new settings will be in effect whenever you log onto the MCI system. If you choose "temporary" by entering **TEMP**, you will have to reset the options the next time you log on. If you select temporary settings, the message **Temporary settings are now in effect** is displayed. But if you select permanent settings, the message **Permanent settings are now in effect** is displayed. After either message is displayed, you should press RETURN, and the main menu (Figure 8-1) will reappear.

Writing an MCI Mail Letter

Letters mailed via MCI can be written either on-line or off-line. In most cases, it is to your advantage to write the letter off-line, using a word processing program like MacWrite, and then upload it to the MCI system. Short messages can be written

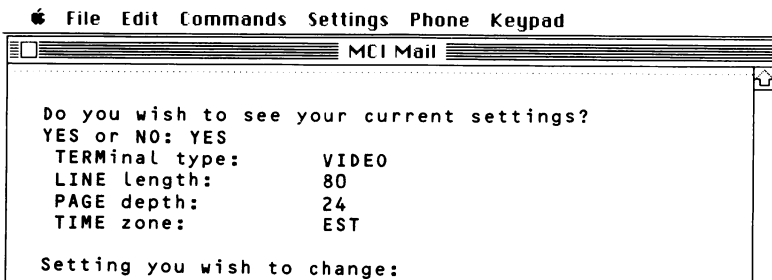
you for your secret password: **PASSWORD:**. (As in most services, the password will not be displayed on the screen as you enter it.) For instance, type **IOFDREFI** and press RETURN.

If you have entered the correct log-on sequence, the introductory MCI message followed by any special announcements or news headlines appears. This is followed by a message telling you if there are any instant letters in your mailbox that need to be read. The entire log-on sequence will be similar to this:



Finally, the MCI main menu (see Figure 8-1) will appear. The first time you use the service, it is a good idea to select the Account option that allows you to identify to the service the characteristics of your personal computer. If you do this, the MCI system will send information formatted for computers like your Macintosh. For instance, the Account option enables you to tell the system the type of terminal you have (video or paper), the line width and page length of the screen, and your particular time zone. Although you can use MCI Mail with your Macintosh without adjusting the Account options, customizing these features will make the display more readable.

To adjust the terminal display, type **ACCOUNT** and press RETURN. The service will first ask if you want to view the current settings; if you respond by entering **YES**, the following may appear on the display:



In addition, you can select various options, such as volume mail, mailing lists, and graphics for letterheads and signatures. You are charged extra for each of these. Furthermore, you can access the Dow Jones News/Retrieval service (see Chapter 11) through the MCI Mail system. (When you are billed for using the service, the charge will come from MCI, not Dow Jones.)

Subscribing to MCI Mail

When you subscribe to the MCI Mail service, you are assigned a user name and a secret password. Both must be entered correctly before you can access the system.

Your user name is typically the first letter of your first name followed by your last name: AFITZGERALD might be the user name for a customer named Asher Fitzgerald. The secret password, however, is a series of random characters that may be difficult for you to remember. For example, the password might be IOFDREFI.

You will also be assigned an MCI Mail ID number and a customer number. The ID number is used to distinguish you from another subscriber who may have the same name. The customer-service number, however, is used for accounting purposes. Neither has to be entered when you log onto the MCI Mail system.

Signing up with the service also means you get a series of quick reference guides that serve as the system documentation. Additional information, such as a complete user's guide, brochures on volume mail, and a letterhead and signature kit, is also available free of charge.

Logging Onto MCI Mail

Accessing MCI Mail requires your Macintosh telecommunications system to be properly connected, with the communications parameters set to 300 baud, XON/XOFF (flow control) enabled, 7-bit word length, no parity (ignore parity), and 1 stop bit.

Once the system is set up and running, you can dial the MCI Mail phone access number that is closest to you. MCI Mail provides phone access numbers in more than 30 major cities across the country, and you receive a list of them when you subscribe to the service. If the list does not include a phone number in your area, contact MCI Mail for an updated list or additional instructions.

When you have dialed the number and the MCI phone has answered, press RETURN twice. The first message appearing on your screen is a special message from the service that indicates which part of the system you have accessed, for instance, **PORT 6**.

Next you will be prompted for your user name: **PLEASE ENTER YOUR USER NAME:**. Enter the name you were assigned by MCI and press RETURN. For example, type **AFITZGERALD** and press RETURN. At this point, MCI will ask

service of MCI Communications (the long-distance phone company); and Easy-Link, Western Union's service, are dedicated mail services. Their primary function is to send and receive letters and messages electronically.

EMAIL and SourceMail, the electronic mail branches of CompuServe and The Source, have somewhat more limited capabilities than the dedicated services. For example, mail sent through the CompuServe or Source systems can only be sent to subscribers of that service. (Mail transmitted via MCI can be sent to anyone, anywhere.)

Since there is no envelope to stick a stamp on, you are usually billed on a monthly basis. Some services, such as MCI Mail, charge only for the letters you send, just as with normal mail. When you use an information utility (CompuServe or The Source) to send electronic mail, there is no charge other than your regular on-line costs. In this chapter, both types of electronic mail will be described.

Your Macintosh is an excellent personal computer to use for electronic mail. You can write letters using one of the many available word processing programs (such as MacWrite) or by typing when you are on-line with the service. If someone sends an electronic letter to you, you can read the message, download and store it on disk, and print it out whenever you need to.

MCI MAIL

MCI Mail is one of the most widely used dedicated electronic mail services and offers a variety of mail delivery options. MCI offers, for instance, Instant Letters, which can be delivered in seconds to another MCI Mail subscriber. All that person has to do is turn on his or her computer and check the "mailbox." MCI's Four Hour Letters are delivered within four hours to designated cities throughout the U.S. (Atlanta, Boston, Chicago, St. Louis, Dallas, San Francisco, and others). The person receiving a Four Hour Letter doesn't have to be an MCI subscriber. Overnight Letters are delivered before noon the next day to anyone (MCI subscriber or not) located in one of 20,000 cities across the country. Finally, MCI letters (sent from your Macintosh) are delivered via first-class mail faster than when you mail the letter via regular mail. MCI Mail also allows you to send telexes, a method of communication similar to electronic telegrams. (The telex system is used primarily by people engaged in international business to send messages quickly and cheaply to offices in other parts of the world.) If you have a telex number, you can use your Macintosh to receive telexes.

Unlike some information services, MCI does not charge you for signing up with the system or charge for on-line communication time. Nor is there a minimum monthly charge—you pay only when you mail a letter. Mailing a three-page Instant Letter (computer-to-computer) costs about \$1; an additional three pages will cost another \$1. MCI Letters (mailed from your Macintosh but delivered via first-class mail) cost about \$2 to mail, Overnight Letters cost \$6, and Four Hour Letters cost \$25.

8

ELECTRONIC MAIL

With the advent of electronic mail, the Post Office motto should perhaps be changed to “Neither snow, nor rain, nor gloom of night, nor software bugs . . .” Even with the possibility of program errors, electronic mail is one of the main reasons many people become involved with telecommunications in the first place.

Electronic mail essentially consists of any message or letter that is written on a computer and transmitted (mailed) by that computer over a telecommunications line. What happens once the letter is sent depends on a number of things: to whom it is sent, where it is sent, how quickly it is to be delivered, and whether or not the recipient has a computer.

Electronic mail takes many different forms. Most electronic mail services allow you to send letters instantly from one computer (your Macintosh, for instance) to another. If the person to whom you are sending electronic mail doesn't have a computer, some services print out the letter on their printer and deliver it to the recipient within hours. The one thing all electronic mail services have in common, however, is that letters can be sent more quickly than with traditional postal service.

Databases that offer electronic mail services include Western Union, MCI Communications, CompuServe, and The Source. Generally speaking, electronic mail services fall into two categories: those “dedicated” to electronic mail and those offering electronic mail as a feature of a larger service. MCI Mail, the mail

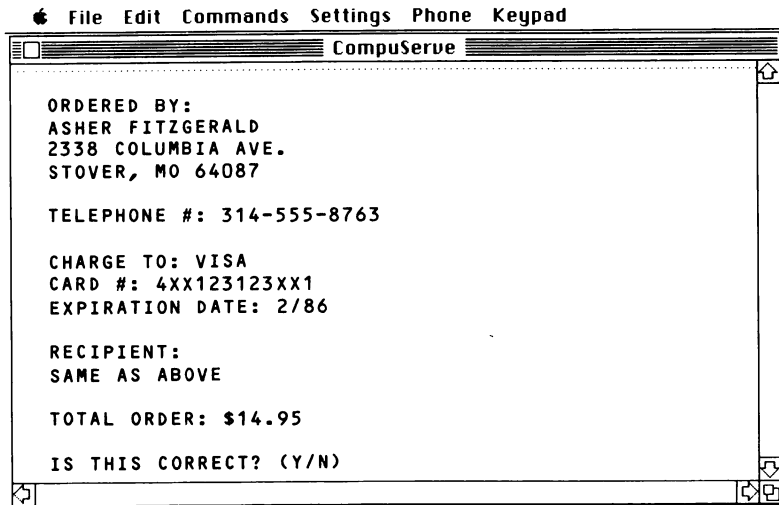


Figure 7-10. Sample order confirmation display

confirmation number will appear. Write this number down and save it; all communication with the store about the order must refer to this number.

Also remember that you can cancel the order at any time before the order confirmation number appears by typing **EXIT** and pressing RETURN. If you need to cancel an order after the order has been placed, you can do so by contacting the store directly by telephone, regular mail, or electronic mail. Information (addresses, phone numbers, and so forth) about how to contact a store is included in the introductory information about the store (refer to Figure 7-1).

Every store will have a slightly different procedure for ordering merchandise. Some stores in the Electronic Mall provide catalogs that are sent to you on request, so you can browse through them at your leisure, going on-line with the store only to actually place the order. Most stores, however, are like Waldenbooks in that they have an on-line catalog.

New stores join the Electronic Mall continuously, and new products are offered by member stores on a regular basis. Furthermore, most stores run special sales on a regular basis. Stark Brother's Nursery, for example, offers discounts for bedding plants in the spring, and computer supply stores offer discounts on software packages.

and the order form will continue. If not, type N and you are reprompted so you can correct the order.

If the ordering information is correct, the order form continues with the billing information. Specifically, you must enter the name and address of the person paying for the purchase (the billing person), the method of payment, and the name and address that the article is to be shipped to. In each instance, you are prompted for the information.

Entering the name and address of the billing person is relatively straightforward: when the : prompt appears, just enter the information requested (name, street address, city, phone number, and so on) and press RETURN.

In almost every case, the method of payment is a charge card. Waldenbooks, for instance, might present payment options like those shown in Figure 7-9.

After specifying the method of payment you wish to use, you'll be asked the card number and expiration date on the card. Next the store will query whether or not the article is to be shipped to an address other than the card's billing address. Finally, the order confirmation is displayed (refer to Figure 7-10).

Once you type Y and press RETURN, the order will be placed and an *order*

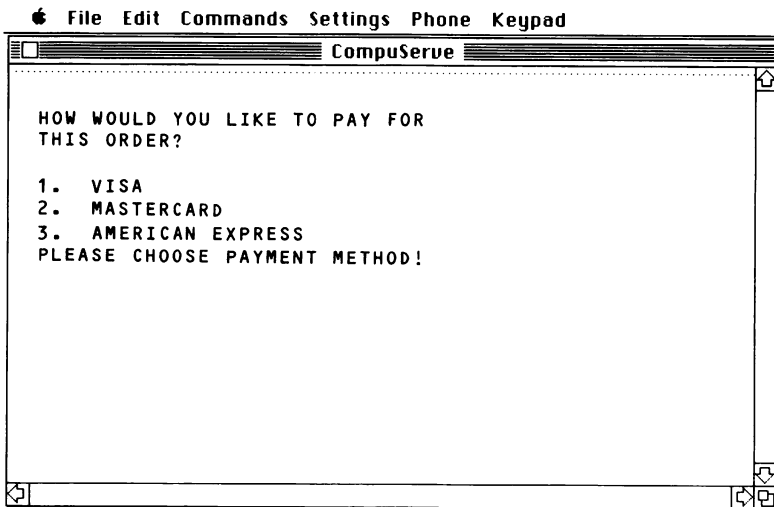


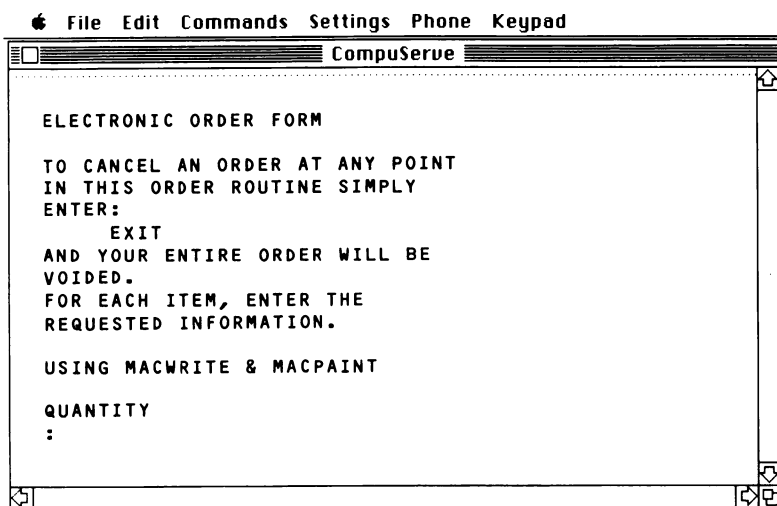
Figure 7-9. *Sample method of payment menu*

This message just tells you that you have placed the book into your “shopping cart.” Remember that you won’t have to pay for the item until you leave the store.

LEAVING A STORE AND PAYING FOR AN ITEM

When you are ready to leave a store, just return to the store’s “entrance,” or main menu (see Figure 7-3), by typing **M** (for “previous menu”) several times and pressing RETURN at the **!** prompt. When you do this at the store’s “entrance,” an order form will appear. (See Figure 7-8.)

The only difference between Figure 7-8 and a standard catalog ordering form is in the name of the article itself. This form shows that you have ordered *Using MacWrite™ & MacPaint™*; it then asks how many (“quantity”) of that item you wish to order. Type **1** and press RETURN to order a single book. (If you have ordered other books, their titles and the quantity prompt will then be displayed.) Following that will be an “order summary” form that lists each article you have ordered, the quantity and price of each item, and finally the total dollar amount of the purchase. The store then asks if the information is correct; if so, type **Y** (for yes)



The image shows a screenshot of a computer window titled "CompuServe". The window has a menu bar at the top with the following items: Apple logo, File, Edit, Commands, Settings, Phone, and Keypad. Below the menu bar is a title bar with the text "CompuServe". The main content area of the window displays the following text in a monospaced font:

```
ELECTRONIC ORDER FORM

TO CANCEL AN ORDER AT ANY POINT
IN THIS ORDER ROUTINE SIMPLY
ENTER:
    EXIT
AND YOUR ENTIRE ORDER WILL BE
VOIDED.
FOR EACH ITEM, ENTER THE
REQUESTED INFORMATION.

USING MACWRITE & MACPAINT

QUANTITY
:
```

The window has a standard Mac OS-style border with a scroll bar on the right side and a small icon in the bottom right corner.

Figure 7-8. *Electronic order form*

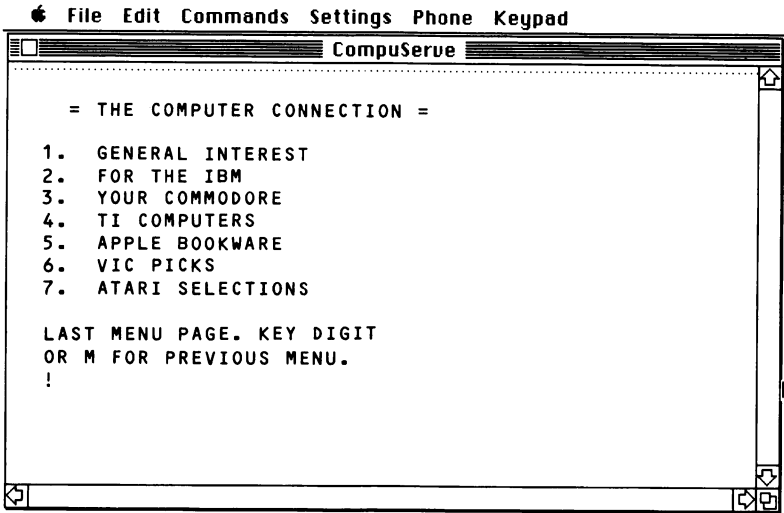


Figure 7-6. *Sample article section in an electronic store*

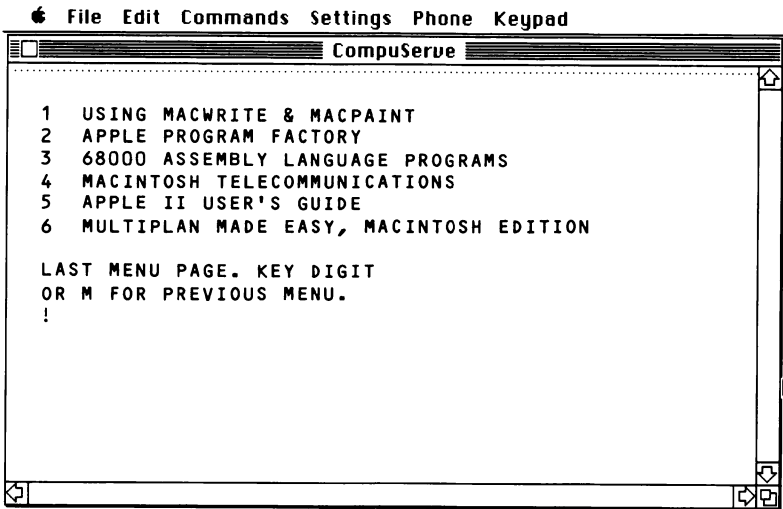


Figure 7-7. *Sample article selection menu from an electronic store*

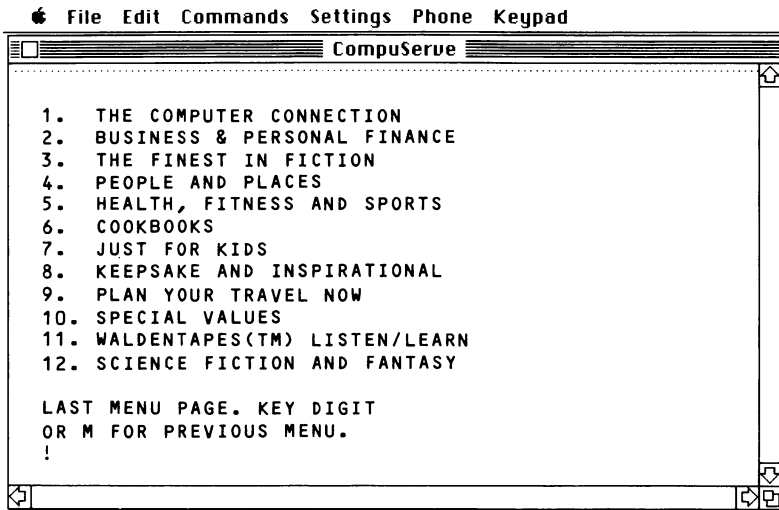


Figure 7-5. Sample product category menu

Books on the Macintosh would obviously be found in the first section, so type **1** and press RETURN. The computer book section menu will then appear, as shown in Figure 7-6.

Since you are looking for an Apple book, type **5** and press RETURN. The first thing you will see is a message that says

6 ARTICLES SELECTED

This is the store's way of telling you how many books in the selected category are in stock. In this case, Waldenbooks has six Apple-related books. After that, the individual titles will appear on the screen. (See Figure 7-7.)

By pressing the keys that correspond to the numbers in the left-hand column, you can read a description of each book and be told the price. After reading the descriptions, assume that you want to buy *Using Mac Write™ & MacPaint™*. To do so (when a menu like that in Figure 7-7 is displayed), type **0 1** and press RETURN. This simply tells the store you wish to "order book #1." (If you wanted to order *Multiplan™ Made Easy, Macintosh™ Edition* instead, you would type **0 6** and press RETURN.) When you do order an article, the following message will then appear:

**YOUR ORDER HAS BEEN PLACED
IN YOUR PERSONAL ORDER FILE
!**

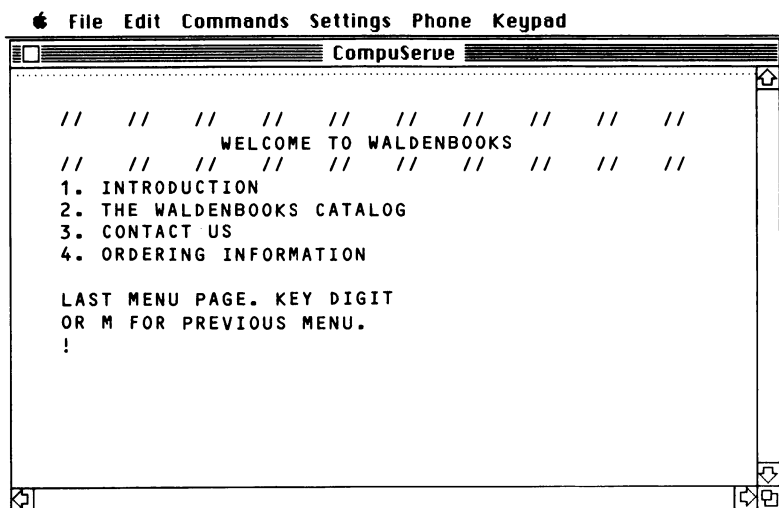


Figure 7-3. *Sample main menu*

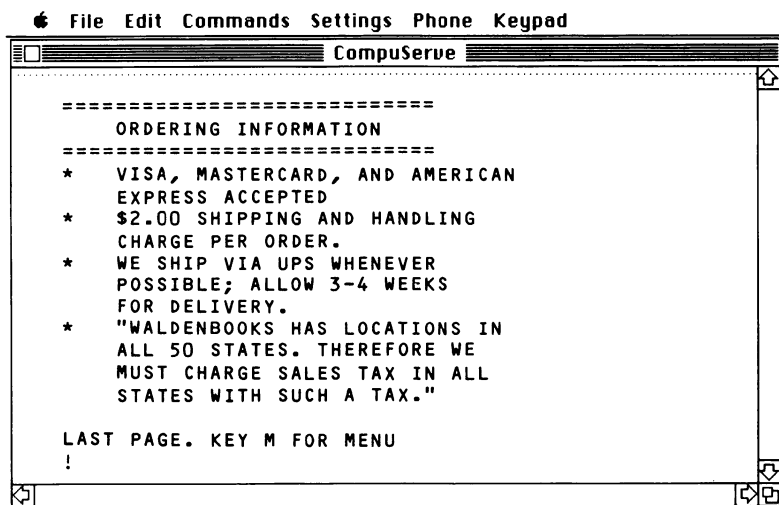


Figure 7-4. *Sample ordering information*

ENTERING A STORE

From the main Electronic Mall menu, type **4** and press RETURN. A list of stores (see Figure 7-2) arranged alphabetically will begin scrolling down your screen.

Notice that the left column lists the name of the store and the right column displays the Go command followed by the store code. When you have identified the store at which you want to shop, type **GO** and the store code when the **!** prompt is displayed. In this instance, try shopping at Waldenbooks by typing **GO WB** and pressing RETURN. When you do so, Waldenbooks' introductory menu will appear. (See Figure 7-3.)

Since every store has a slightly different ordering procedure, you should always read the ordering procedures section, especially if you are entering the store for the first time. In this case, type **4** and press RETURN. Waldenbooks' ordering information will then appear (refer to Figure 7-4).

By typing **M**, you will return to Waldenbooks' main menu (Figure 7-3). To begin shopping, select option 2, The Waldenbooks Catalog, by typing **2** and pressing RETURN. A list of book categories, just like the labels on the shelves in a regular bookstore, will then appear. (See Figure 7-5.)

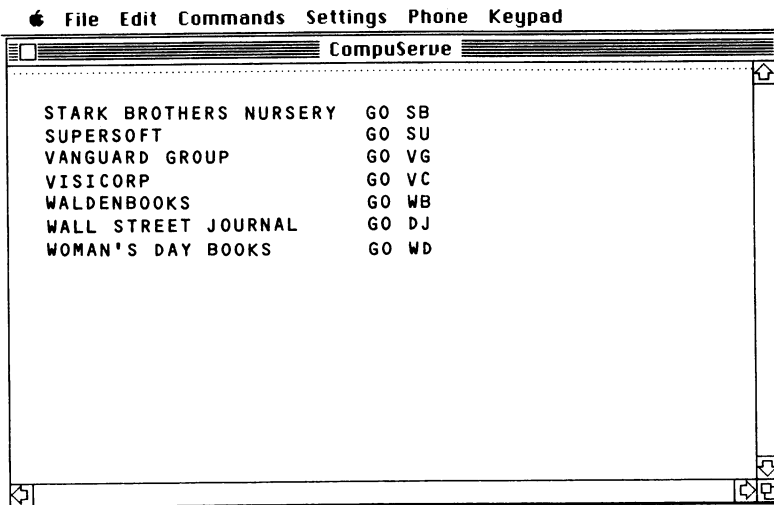


Figure 7-2. Partial list of Electronic Mall stores

shipping address, and credit-card number, and the items will be shipped to you in a couple of days.

ENTERING THE MALL

To get to the Electronic Mall, log onto CompuServe (see Chapter 4 for details), and when the CompuServe main menu appears, select option 5, Electronic Mall. (If you are somewhere else in the system, you can reach the mall by typing **GO EM-1** and pressing RETURN.) The Electronic Mall main menu will then appear. (See Figure 7-1.)

The first time you enter the mall, you should type **1** and press RETURN to read the introductory material. After that (and every time you go to the mall, for that matter) you should read the New and Noteworthy section, number 2 on the menu, to see if any new stores or services have been added.

The following example illustrates how to find your way around the Electronic Mall. Assume that you are going shopping for a book, specifically a book about the Macintosh. To begin, you need to know what bookstores are located at the mall; then you need to “enter” a store and order a book.

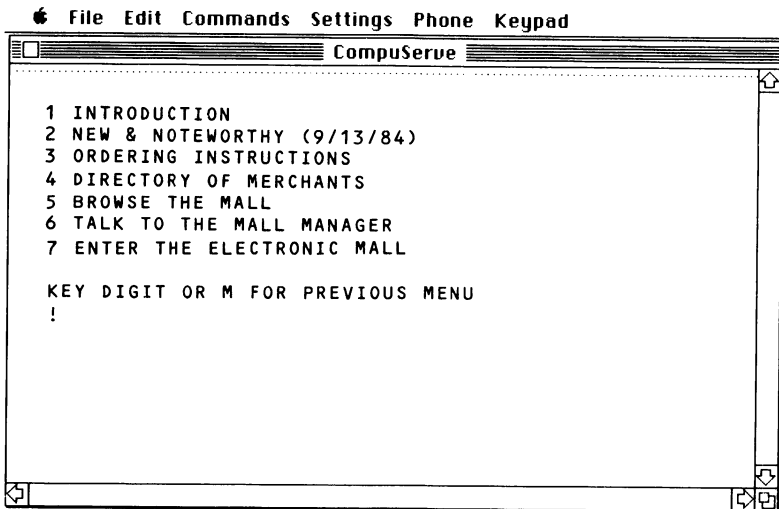


Figure 7-1. *Electronic Mall main menu*

DESKTOP SHOPPING (THE ELECTRONIC MALL)

It is possible to go shopping at many of your favorite stores 24 hours a day without standing in line or having to fight for a parking spot — just use your Macintosh to go on-line with the Electronic Mall. Some of the stores in the Electronic Mall are Bloomingdale's, Sears, E.F. Hutton, 47th Street Photo, Colonial Penn Insurance, Big T Automotive, McGraw-Hill Books, Kodak, Waldenbooks, RCA Record Club, and Stark Brother's Nursery — and there are many, many more.

Once you have entered the Electronic Mall via CompuServe, you can browse through the stores just as you would at any other shopping mall. Or if you know exactly what store you want to patronize, you can go directly to it and see what they have in stock or on sale.

When you have found an item you want to buy, just drop it in your “shopping basket” by typing **O** (or typing the word **ORDER**) and keep on browsing. When you have found another item, drop it in your basket the same way. You don't pay for the articles you have collected until you “exit” the store (just as with any other store).

At the “checkout stand,” you are asked what method of payment you want to use: the store's charge card, VISA, MasterCard, or whatever. If you have a Sears credit card, for instance, you can charge any purchases at Sears electronic store to your account. When the order form appears on the screen, simply enter your name,

Let's assume you want to pay by personal check — type **CH** and press RETURN. Comp-U-Store will respond with the message

**A TWO WEEK DELAY OCCURS WHILE CHECK CLEARS.
PAY BY CHECK? (Y OR N):**

If you don't mind the wait, type **Y** and press RETURN.

You will then be told to whom you should make out the check (Comp-U-Store) and asked the exact address to which the television is to be shipped.

Finally, you are given one last chance to cancel the order. Comp-U-Store will display a referral number (that is, the electronic equivalent of a receipt) for you to copy.

Once the order is processed and confirmed, Comp-U-Store automatically returns you to the Top menu, where you should type **EXIT** and press RETURN to return to CompuServe. Next, type **BYE** and press RETURN to log off CompuServe.

FINDING OUT MORE ABOUT COMP-U-STORE

If you want more information on Comp-U-Store, write or call the service at

Comp-U-Card of America, Inc.
777 Summer Street
Stamford, CT 06901
Telephone: 800-243-0266 (in all states except Connecticut)
800-942-3315 (in Connecticut)

Comp-U-Store can also be accessed through The Source or Dow Jones; if you subscribe to them, see your user's guides for information on accessing Comp-U-Store. In addition, both CompuServe and The Source provide their own shopping services for such merchandise as books, records, clothes, artwork, and more. Again, see the user's guide for more details.

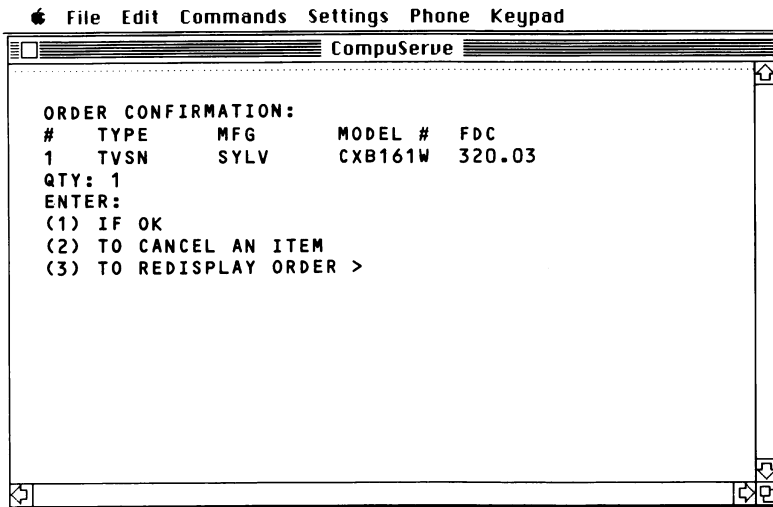


Figure 6-13. Order Confirmation menu

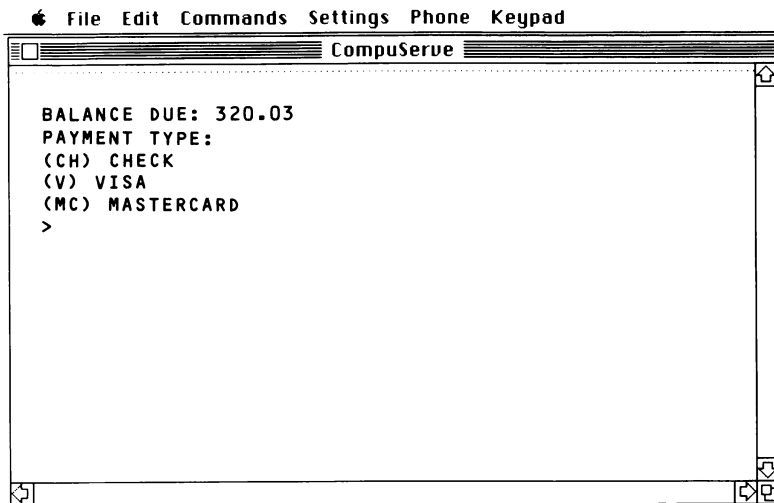


Figure 6-14. Display of balance due and payment choices

If you don't want to order this TV, type **N** and press **RETURN**, and the previous menu will appear. The next section describes what happens if you do want to order the product.

ORDERING MERCHANDISE THROUGH COMP-U-STORE

When you decide that you want to place an order with Comp-U-Store, answer the question in Figure 6-11, **WANT TO ORDER? (Y OR N)**, by typing **Y** and pressing **RETURN**.

Comp-U-Store will then ask you how many of the items you want to order: **QUANTITY:**. Since you want only one TV, type **1** and press **RETURN**. Comp-U-Store then displays a message like the one shown in Figure 6-12.

To order the TV, type **3** and press **RETURN**. Comp-U-Store will return with a display similar to that in Figure 6-13.

Since the ordering information is correct, type **1** and press **RETURN**. Comp-U-Store then tells you how much you owe and asks how you want to pay. (See Figure 6-14.)

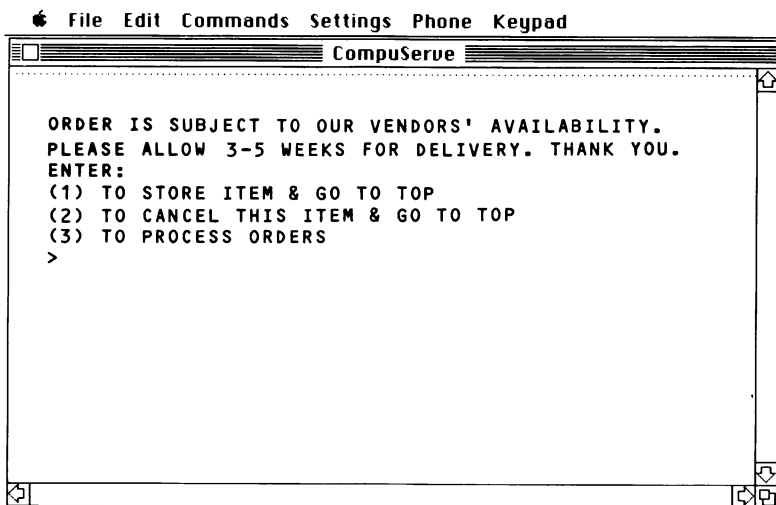


Figure 6-12. *Order Initiation menu*

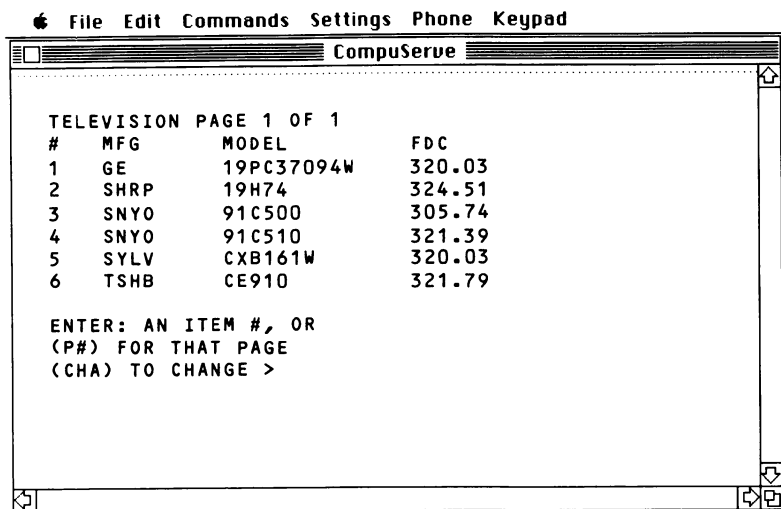


Figure 6-10. List of goods meeting shopper's specifications

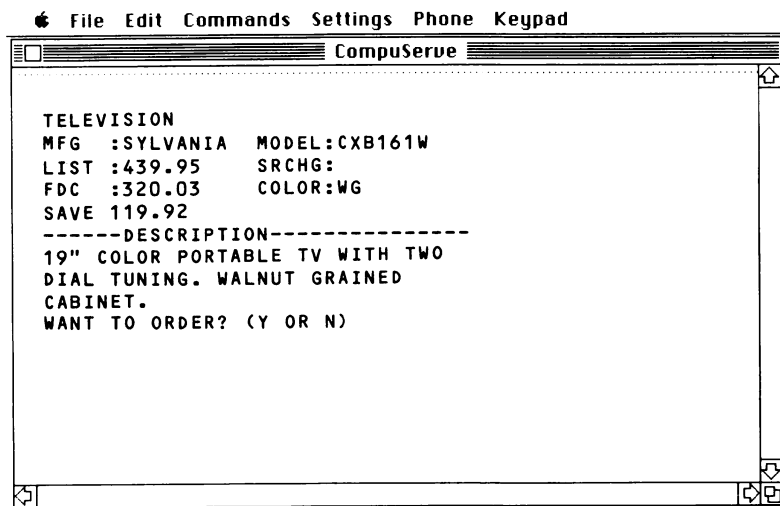


Figure 6-11. Specifications of a particular product

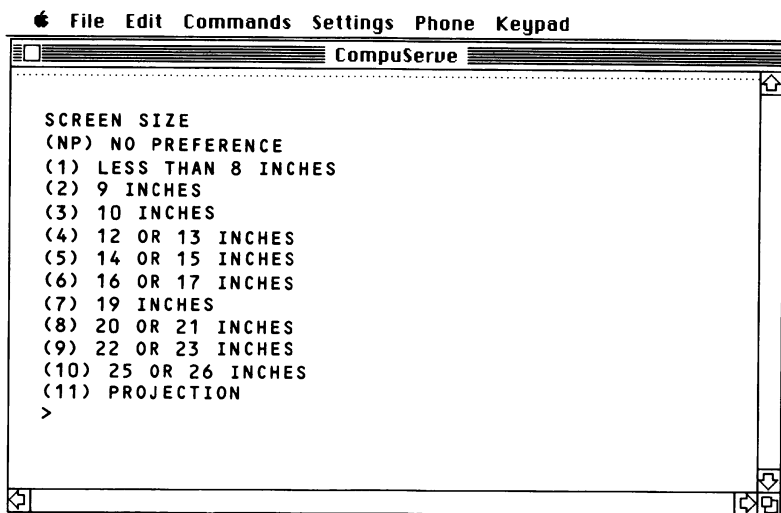


Figure 6-9. *List of TV screen sizes*

Comp-U-Store will then ask where the TV is to be shipped. (Shipping charges are automatically figured into the quoted price.)

```
SHIP-TO-STATE  
(NECESSARY FOR QUOTE)  
>
```

Let's assume you live in Chicago; type **ILLINOIS** and press RETURN.
Finally, Comp-U-Store asks

```
WHAT'S THE MOST YOU WILL SPEND?  
>$
```

Since you've already decided not to spend more than \$325, type **325** and press RETURN. Comp-U-Store will then display a list of all televisions that meet your specifications. (If Comp-U-Store has no product meeting your specifications in the price range you're after, it will tell you so at this time.) (See Figure 6-10.)

If you are interested in the Sylvania unit, type **5** and press RETURN. A display similar to that in Figure 6-11 will appear.

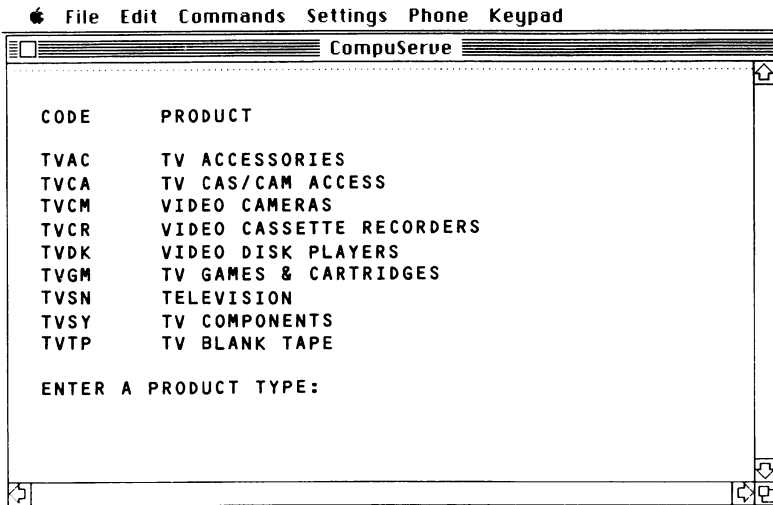


Figure 6-8. *Subcategories within a merchandise category*

You aren't looking for a particular brand of television, so type **NP** and press RETURN.

Next, Comp-U-Store will ask if you want a black-and-white or color TV.

```
COLOR OR BLACK & WHITE
(NP) NO PREFERENCE
(1) COLOR
(2) BLACK & WHITE
```

Type **1** and press RETURN for color TVs.

Since TVs differ by screen size, you will be asked what size you are interested in. (See Figure 6-9.) Nineteen-inch TVs are a standard size, so type **7** and press RETURN.

Comp-U-Store will now ask if you want remote control.

```
REMOTE CONTROL
(NP) NO PREFERENCE
(1) YES
(2) NO
>
```

If you don't, type **2** and press RETURN.

Enter the number assigned to you when you subscribed to Comp-U-Store and press RETURN. You will be prompted

```
ENTER ACCESS CODE:  
>
```

Since the Access Code is secret, it will not appear as you type. When you have entered it, press RETURN. Once you are on-line with Comp-U-Store, a menu similar to the one shown in Figure 6-6 will appear.

It's a good idea to start by requesting a list of merchandise categories. Type **LIST** and press RETURN. Once you've done so, a display similar to that in Figure 6-7 will appear. For TV and Video Equipment, type **8** and press RETURN.

A list of the different categories of TV products that Comp-U-Store provides then appears. (See Figure 6-8.) Since you are looking for a television, type **TVSN** and press RETURN. Comp-U-Store next prompts

```
ENTER:  
    BRAND NAME  
    (NP) NO PREFERENCE  
    (LIST) BRAND LISTING  
>
```

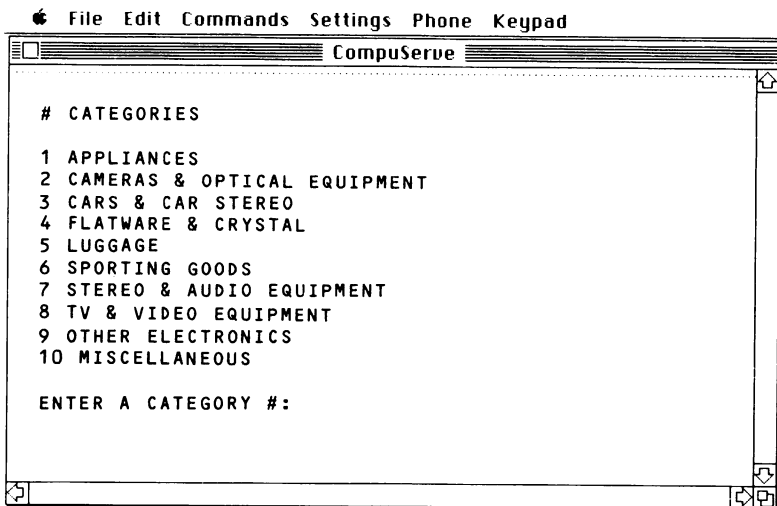


Figure 6-7. *Comp-U-Store list of merchandise categories*

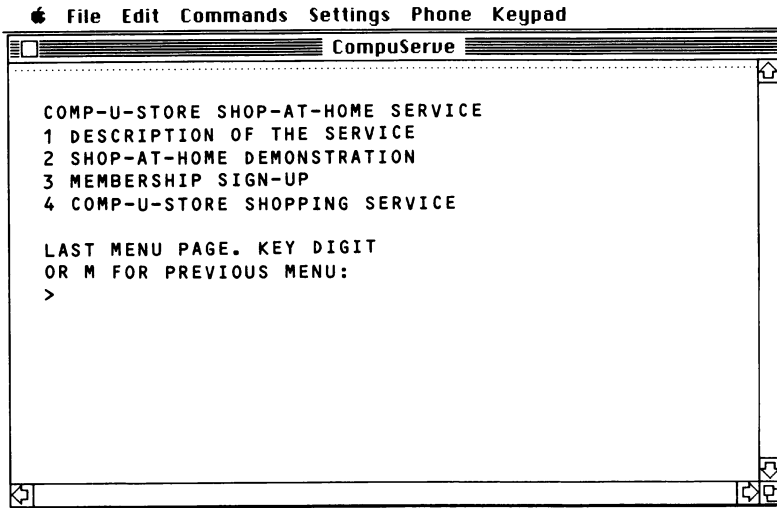


Figure 6-5. *Comp-U-Store menu for nonmembers*

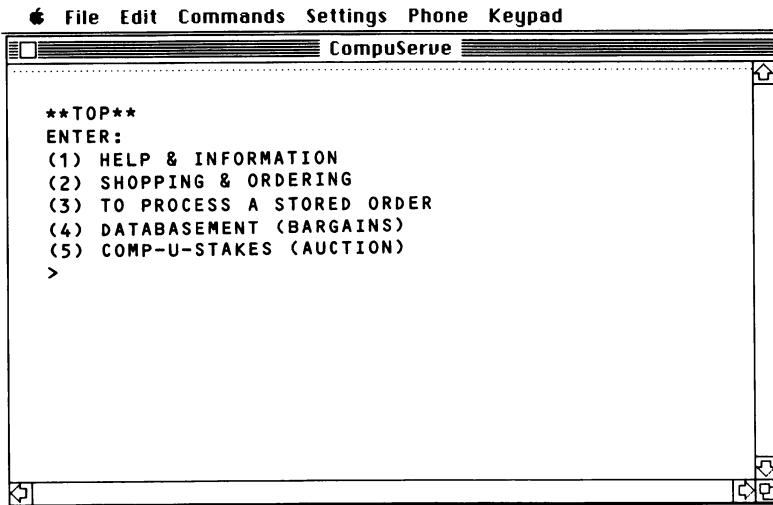


Figure 6-6. *The Top menu*

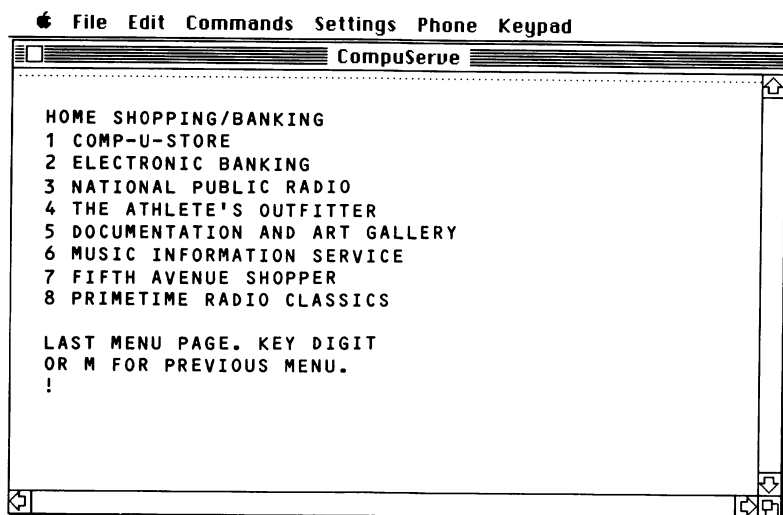


Figure 6-3. *Home Shopping/Banking menu*

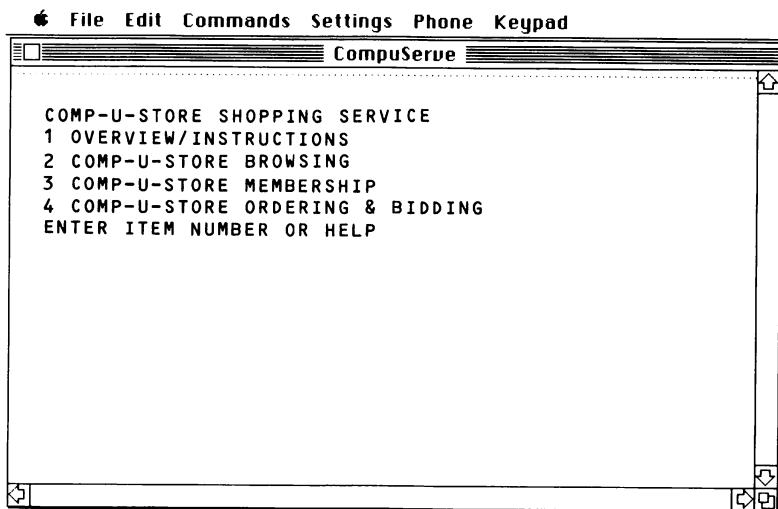


Figure 6-4. *Comp-U-Store menu for members*

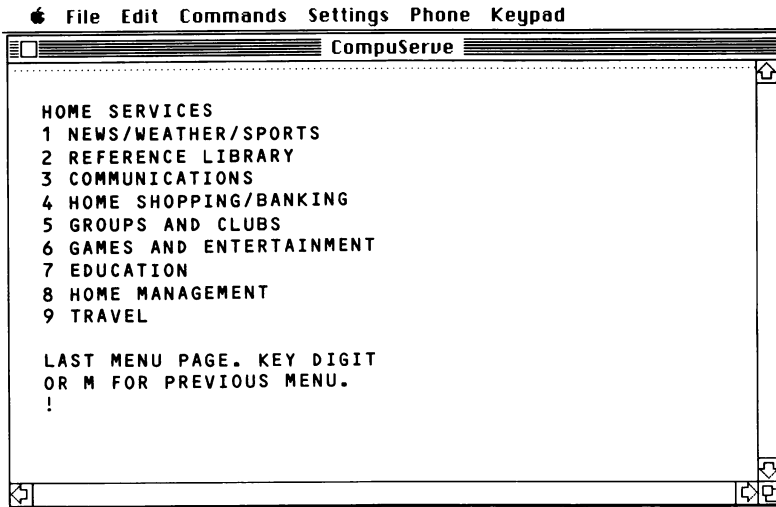


Figure 6-2. *CompuServe Home Services menu*

command prompt, which signifies that the information service is waiting for you to type in something. To get to Comp-U-Store, select option 1, Home Services, by typing **1** and pressing RETURN. You'll then be presented with another menu that looks like that in Figure 6-2.

Select option 4, Home Shopping/Banking, by typing **4** and pressing RETURN, and CompuServe will take you to the Home Shopping/Banking menu. (See Figure 6-3.) Select option 1, Comp-U-Store, and you will be presented first with Comp-U-Store's introductory message and then, if you're a Comp-U-Store member, with the first Comp-U-Store menu (see Figure 6-4).

If you're not a Comp-U-Store member, you may get a special menu that offers a description of the service, a shop-at-home demonstration, and an on-line membership sign-up. (See Figure 6-5.) (The **>** is the Comp-U-Store command prompt that signifies the service is waiting for you to type something.) If you're not a member, you'll be able to see the Top menu (Figure 6-6) — although you still won't be able to order.

If you are a Comp-U-Store member, select option 4 on the menu in Figure 6-4 by typing **4** and pressing RETURN; you will be prompted

ENTER MEMBERSHIP #:

Among the other goods you can buy are

- New cars (for only \$125 over dealer's cost)
- Stereos
- Telephone equipment
- Sewing machines
- Furniture (everything from patio furniture to recliners)
- Luggage
- Refrigerators
- Microwave ovens
- Computers and computer products (hardware and software).

How do you pay for purchases? Just as you would at any other store — with your personal checks, VISA, or MasterCard.

ACCESSING COMP-U-STORE

Once you've logged onto CompuServe (see Chapter 4 for details), you will be presented with a screen similar to the one in Figure 6-1. The ! is CompuServe's

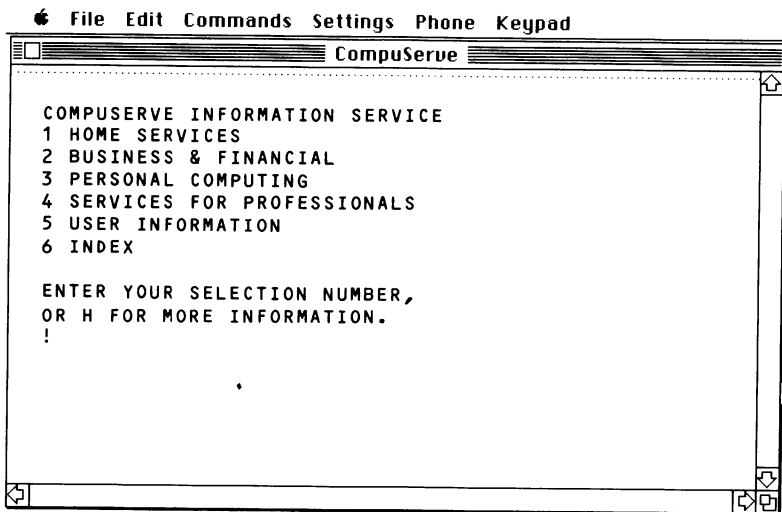


Figure 6-1. *CompuServe main menu*



DESKTOP SHOPPING (COMP-U-STORE)

It sometimes takes time you don't have to read the newspaper ads or drive from store to store to find the best buy—even for major purchases. When running around looking for that best buy—and sometimes finding it—you realize you are wasting a lot of time and money.

Connecting your Macintosh to a telephone lets you shop right at home 24 hours a day, 7 days a week. Your shopping is done through the Comp-U-Store Home Shopping Service available at additional cost through CompuServe and several other information services. You don't have to put up with salespeople, long lines, traffic jams, and all the other headaches of shopping. Best of all, you save money.

Let us say your TV is on the fritz, and you begin looking around at new color sets. You know what you want and what you can afford—and the two figures don't match up. You can spend about \$350, yet the set you want lists for about \$500. After checking stores, you have just about decided that you'll have to settle for less than you wanted.

Comp-U-Store, a database service that provides information on over 50,000 name-brand items (everything from roller skates to pianos), generally sells color TVs for 40% less than the list price in most regular stores: \$320 through Comp-U-Store, compared to \$450 list, a savings of \$130.

display the transaction number and ask if you want to make another payment. The transaction number is, in effect, your receipt number for the payment. If you correspond with the payee (California Gas and Electric in this example) or with your bank, this number will identify the payment. Therefore, you should write it down or make some record of it. Now that the transaction is complete, you can pay another bill, check your balance, or log off the system. If you want to pay another bill, respond to the following prompt with a "yes":

```
PAYMENT ACCEPTED  
TRANSACTION NUMBER 199299  
ANOTHER PAYMENT?  
Y/N OR CMD:
```

LOGGING OFF THE HOMEBANKING SERVICE

You can exit the HomeBanking service at any time by typing **=LO** and pressing RETURN. When you do, a sign-off message will be displayed, telling you the session has concluded. You can then exit the MacTerminal program.

This chapter describes only one of the many services that home banking provides. However, it should illustrate how easy it is to perform even relatively complicated transactions on your Macintosh. For a complete description of all the features offered by home banking, check with a bank that provides such a service.

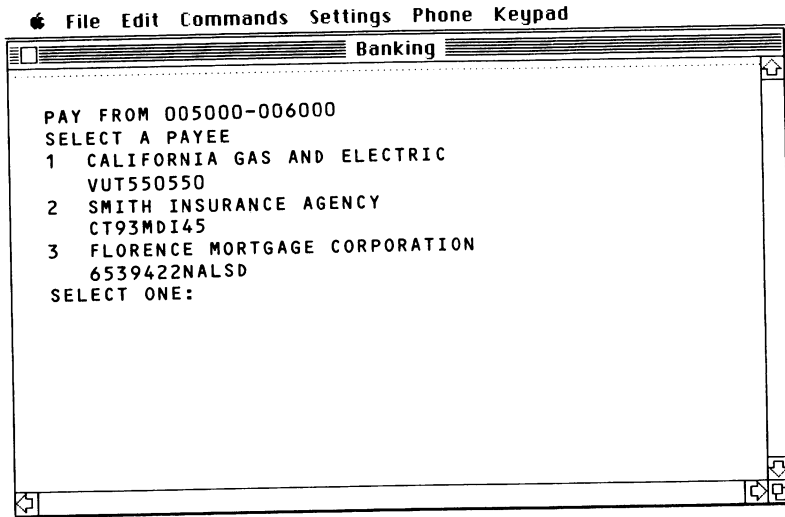


Figure 5-3. Sample payee list

press RETURN. HomeBanking will ask you the date you want to pay the bill:

ENTER T FOR TODAY'S BUSINESS DATE OR MM/DD/YY FOR
FUTURE DATE

If you want the bill to be paid immediately, just type **T** and press RETURN. However, you can enter a future date (for instance, the exact day the bill is due), and the funds will not be transferred until that time. This is especially useful if you have an interest-drawing checking account and want to keep as much money in the account as you can for as long as possible. It is also useful if you are going out of town for an extended period and want to be sure all bills are paid on time in your absence.

Next you'll be asked the **AMOUNT\$**: you want to pay. Simply enter the amount; for example, if the bill is \$37.82, type **37.82** and press RETURN. HomeBanking will then display a payment confirmation such as this:

FROM 005000-006000
PAY CALIFORNIA GAS AND ELECTRIC
VUT550550
ON 11/08/84 \$37.82
PLEASE CONFIRM
Y OR N:

If all the information is correct, type **Y** and press RETURN. HomeBanking will then

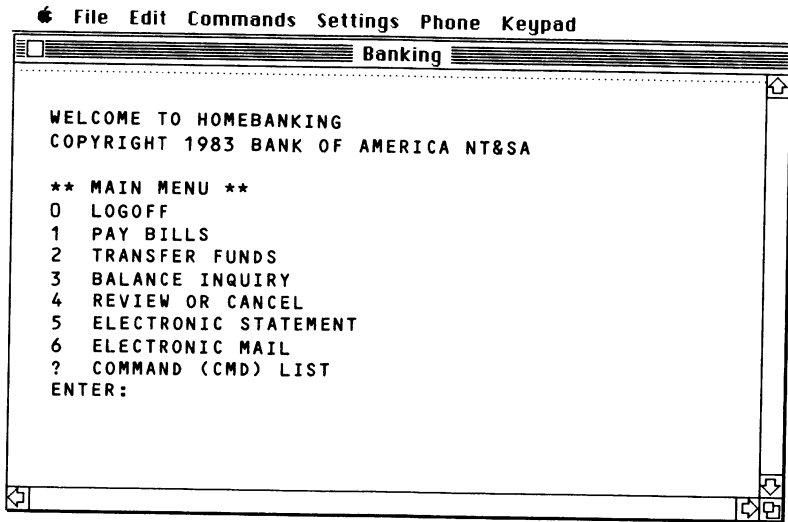


Figure 5-2. *Sample HomeBanking main menu*

Using HomeBanking to Pay Bills

Before you can use home banking to pay any bills, you must tell the banking service who the payees are when you subscribe to the service (or in writing thereafter). If a business you want to pay isn't listed on the payee directory, check with the business or with the banking service to see if it has registered recently. The following example describes how you might use HomeBanking to pay a monthly utility bill.

To begin paying the bill, select the Pay Bills option from the main menu (refer to Figure 5-2) by typing **1** and pressing RETURN. The first message that appears is a list of your bank accounts from which bills can be paid. You identify these accounts when you subscribe to the service. If you have several accounts at the bank, you do not have to list them all—only the ones you wish to pay the bills. For instance, if your home and business checking accounts are registered, both account numbers will be displayed so you can select the account to use.

Once you have selected the bill-paying account, a list of your payees will be displayed. Below the name of each business is the billing account number you have with the firm. (See Figure 5-3.) To identify the company you want to pay, type the number in the left column that corresponds to the business and press RETURN.

To pay a utility bill when a screen similar to Figure 5-3 is displayed, type **1** and

telecommunication service you want to access. Remember that your particular response to this Tymnet prompt will depend on your geographical location and the home-banking service you are using. For example, type **HBSF** (for “HomeBanking in San Francisco”). At this point you will be communicating directly with the home-banking service.

LOGGING ONTO THE HOMEBANKING SERVICE

The first message HomeBanking will send you when you make the teleconnection is **HOST: CALL CONNECTED**; you will then be asked to **ENTER ID:**. For HomeBanking, the format for the ID number is a) (right parenthesis) followed by the last nine numbers on your bank convenience card — for instance, **)987654321** — and **RETURN**. Other systems may use a different format.

The next step is to enter your secret password when the message **PASSCODE:** is displayed. The password code is mailed to you after you have registered with the service. You should guard it carefully; in fact, it might be a good idea to memorize the code and then store the original in a safe-deposit box. Enter the code exactly as it is assigned to you. For example, if the password is **SECRET**, type **SECRET** and press **RETURN**.

For security purposes, most banking services (including the Bank of America’s) put a limit on the number of errors you can make while logging on. With most services, only three attempts at signing onto the system can be made. If you haven’t entered the correct password after three attempts, you will be denied access to the banking service, even if you eventually remember and try to enter the correct code. If this happens, you must contact the home-banking office and have a new log-on sequence and password assigned for your use.

USING THE HOMEBANKING SERVICE

When you have successfully logged onto a home-banking service, the introductory message and main menu will usually be displayed. The main menu is a list of the services provided by a particular bank. Figure 5-2 illustrates Bank of America’s HomeBanking main menu. Most services provide menu options and prompts to help you use the system. You can also move to different parts of the system by using direct commands. (For instance, if you want to go to HomeBanking’s main menu, just type **MM**, and you will bypass all other menus.) Until you are familiar with a service, the easiest way to move around the system is by using the menus. To use a menu, simply enter the number (displayed in a menu’s left-hand column) that corresponds to the feature you want to use. With HomeBanking, for instance, you can review your bank account’s current balance by typing **3** and pressing **RETURN** when the main menu is displayed on the screen.

TRAVEL

- 546 Fitzgerald Travel Agency
- 547 West Coast Airlines
- 548 California Rental Car

UTILITY SERVICES

- 462 Albany Sanitary Service
- 684 California Gas and Electric
- 342 Contra Costa Telephone

Figure 5-1. *HomeBanking payee directory*

time you usually identify the account number of the bank account from which the bills are to be paid.

Accessing a home-banking system from your Macintosh keyboard usually requires you to pass through two levels of security: entering an identification number and then a secret password. In many instances the ID number is the same as your bank “convenience card” number that you use with computerized tellers. The password, however, is assigned to you when you subscribe to the home-banking service.

COMMUNICATING WITH A BANKING SERVICE

Before you can begin telecommunicating with a home-banking service, you must set up a MacTerminal document that has the proper communications parameters. Communications parameters required for most home-banking services are full-duplex, 300-baud, and even parity. Set your communications protocol accordingly. (See Chapter 3 for details.)

Most home-banking services are accessed through a telecommunications network like Tymnet or Telenet. Tymnet will be used in the following HomeBanking example, since it is the access network for that service. First dial the local Tymnet phone number (the number should be included with your HomeBanking manual). When the connection to Tymnet is made, the prompt **PLEASE TYPE YOUR TERMINAL IDENTIFIER** will appear. Press the A key. (Nothing will be displayed on the screen.)

Next Tymnet will ask you to **PLEASE LOG IN**. This is where you identify the

5

DESKTOP BANKING

Going to the bank usually means contending with long lines, inconvenient hours, and complicated procedures. Many banks, however, offer “home-banking” services that let you avoid these inconveniences by using your Macintosh to perform a variety of transactions that normally take place at a bank teller’s window. These transactions include paying bills, transferring funds, and reviewing account balances.

While there are many different home-banking services available, this chapter will describe Bank of America’s “HomeBanking” service, which is available on the West Coast. Although HomeBanking has many unique features, it is nevertheless typical of most telecommunication banking services.

Perhaps the main attraction of any home-banking service is that it allows you to pay many of your regular bills without signing a check and hurrying to the post office. Once you subscribe to a home-banking service, bills for home mortgages, utilities, charge cards, hospital and health care, insurance, cable television, credit unions, department stores, newspapers, travel agencies, and the like can be paid quickly and easily.

When you subscribe to a home-banking service, the bank provides you with a *payee directory* listing the businesses that can be paid via your Mac. (See Figure 5-1.) To indicate which businesses you wish to pay, all you do is fill out a form that identifies the name of the business, its code (the left-hand column in Figure 5-1), and the billing account number you have with that particular business. At the same

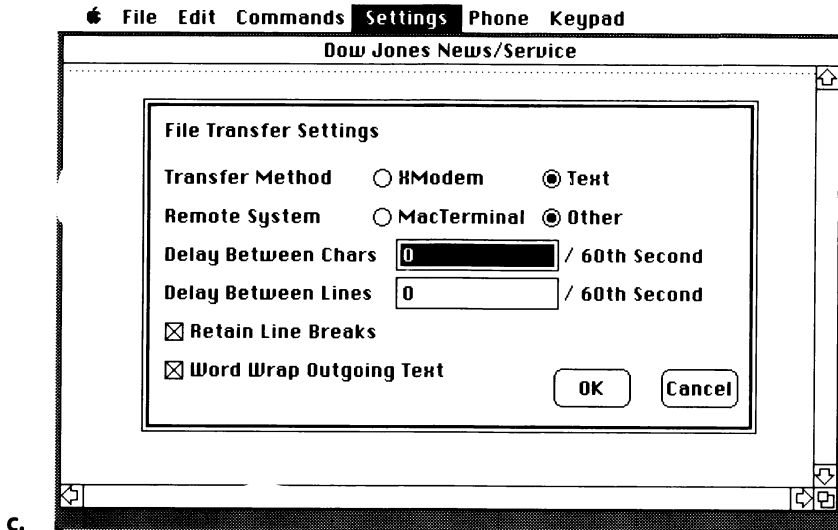
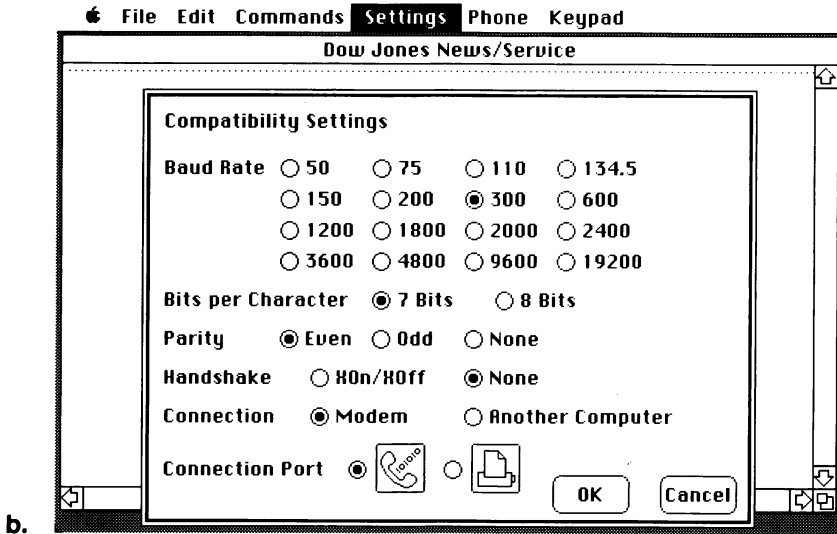


Figure 4-5. *Dow Jones setup parameters (continued)*

Setting Up a MacTerminal Document For Dow Jones

Dow Jones communications requirements differ slightly from those of other major information services. The necessary communications parameters are: 300 baud, 7-bit word length, even parity, XON/XOFF disabled.

MacTerminal settings for compatibility, terminal type, and file transfer methods needed to communicate with Dow Jones are shown in Figure 4-5.

Once you have opened a MacTerminal document, select each of the dialog boxes from the Settings option on the menu bar. After you have chosen the appropriate settings, enter the phone number (select Phone Settings in the Phone menu) and save the document under the filename "DJNS" (select the Save As option from the File menu). Specific log-on procedures are detailed in Chapter 11.

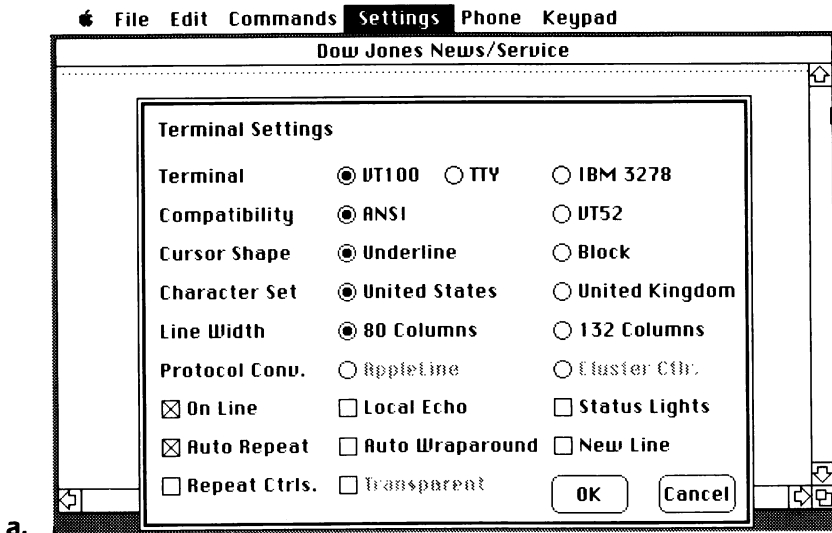
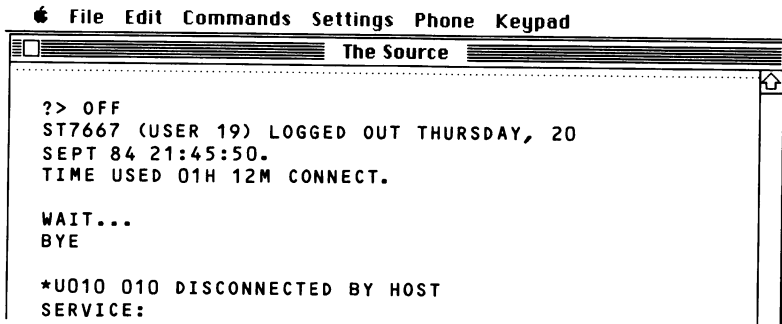


Figure 4-5. Dow Jones setup parameters

What happens next is up to you. Then, when you are ready to log off The Source, just type **OFF** and press RETURN whenever the > prompt is displayed. The Source exit information will then appear:



DOW JONES NEWS/RETRIEVAL

Although Dow Jones News/Retrieval primarily provides financial news, other services such as MCI Mail can be accessed from Dow Jones. Financial information is obtained from the *Wall Street Journal*, *Barron's*, and the Dow Jones News Service. Stock quotes are provided after a 15-minute delay, along with quotes on bonds (corporate and foreign), options, mutual funds, and U.S. Treasury notes.

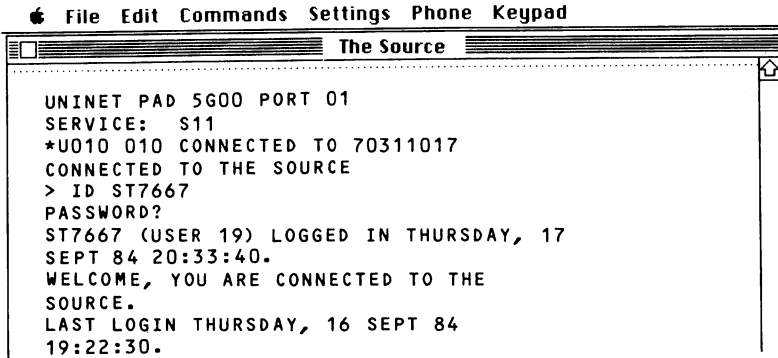
Historical quotes on a company or industry are also available. Detailed information on the New York, American, and over-the-counter markets are provided by Media General Services.

Dow Jones is on-line from 6:00 A.M. to 3:00 A.M. weekdays and from 7:00 A.M. to 3:00 A.M. weekends and holidays.

When you buy a modem from Apple, the package contains a subscription form for Dow Jones. If you subscribe to the service, you'll receive a manual plus an hour of free on-line time. To get in touch with Dow Jones, contact

Dow Jones News/Retrieval
 P.O. Box 300
 Princeton, NJ 08540
 Phone: 800-257-5114 (in all states except New Jersey, and in Canada)
 609-452-1511 (in New Jersey)

sequence should look something like this:



Once you have logged onto The Source, the service's main menu (similar to the one shown in Figure 4-4) will appear.

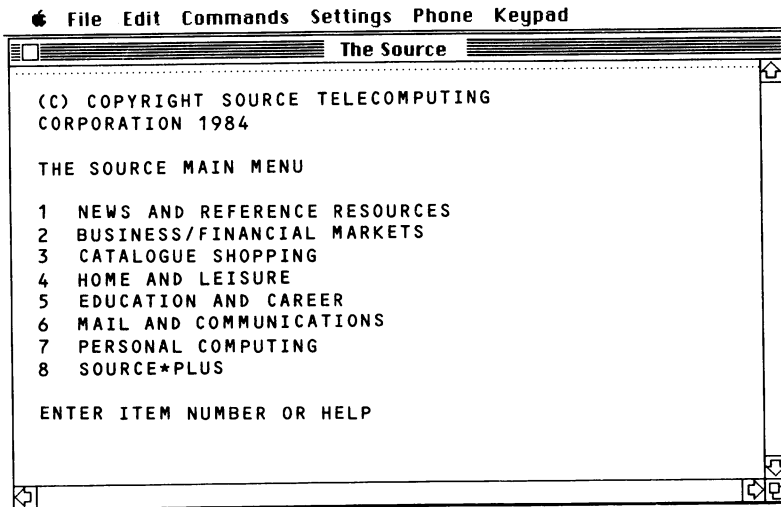


Figure 4-4. *The Source* main menu

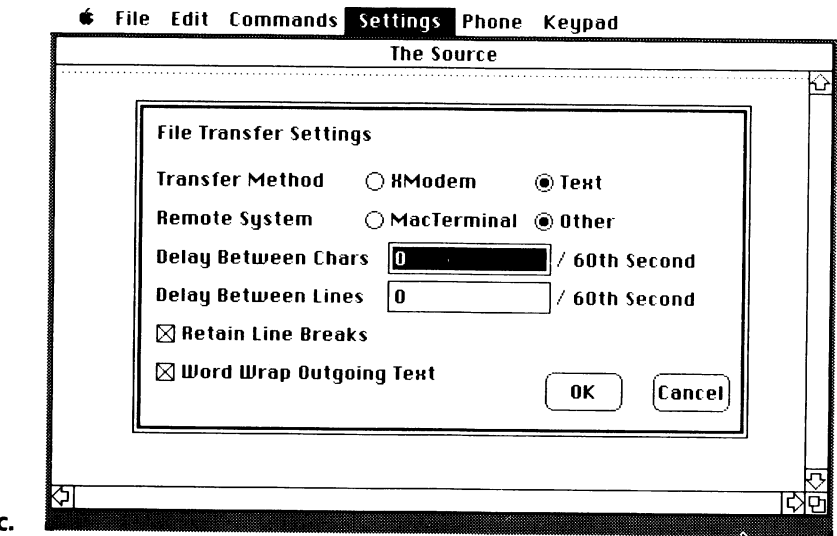
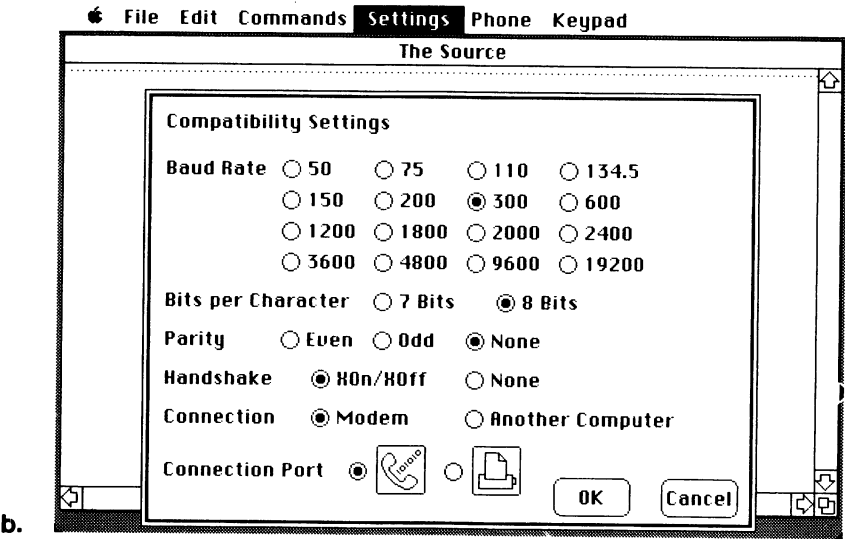


Figure 4-3. The Source setup parameters (continued)

this instance, type **S11** and press RETURN. The introductory Source message will appear.

```
*U010 010 CONNECTED TO 70311017
CONNECTED TO THE SOURCE
>
```

At this point, enter **ID** followed by your personal number and press RETURN. For example, type **ID ST7667** and press RETURN. Next you will be asked to enter your password:

PASSWORD?

Enter the secret password you were assigned when you subscribed to the service. Note that it will not be displayed on the screen as you type it. The entire log-on

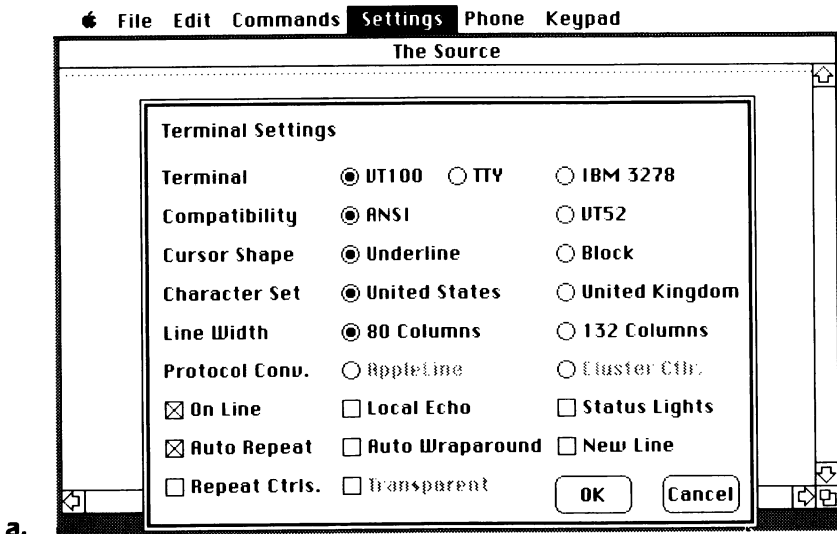


Figure 4-3. *The Source* setup parameters

billing rates: weekday business hours are the most expensive; less expensive are evenings, weekends, and holidays; and least expensive are the hours between midnight and 7:00 A.M.

When you subscribe to The Source, you'll receive an excellent 285-page user's manual that tells you exactly how to use the service. For more information, contact

The Source
1616 Anderson Road
McLean, VA 22102
Phone: 800-336-3366

Setting Up a MacTerminal Document For The Source

Setting up a MacTerminal document to communicate with The Source is similar to setting up a CompuServe document.

The communications parameters required by The Source are: full-duplex, 300 baud, XON/XOFF enabled, 8-bit word length, parity bit zero (none), and 1 stop bit. (Special 1200-baud phone numbers are also available.)

The MacTerminal settings for compatibility, terminal type, and file transfer methods required by The Source are shown in Figure 4-3.

Once you have opened a MacTerminal document, select each of the dialog boxes from the Settings option on the menu bar. After you have chosen the appropriate settings, enter the phone number (select Phone Settings in the Phone menu) and save the document under the filename "The Source" (select the Save As option from the File menu).

Logging Onto The Source

Access to The Source is made through a telephone network like Telenet, Uninet, or Sourcenet. Once you have dialed and are connected to a network, you can log onto The Source. The next sequence uses the Uninet network as an example.

When you have dialed The Source and the Uninet computer has answered, a message and prompt like the following will appear:

```
UNINET PAD 5600 PORT 01  
SERVICE:
```

In response to the Uninet SERVICE prompt, enter the access code that will connect you with The Source; typically, the code is S10, S11, S12, S13, or S14. In

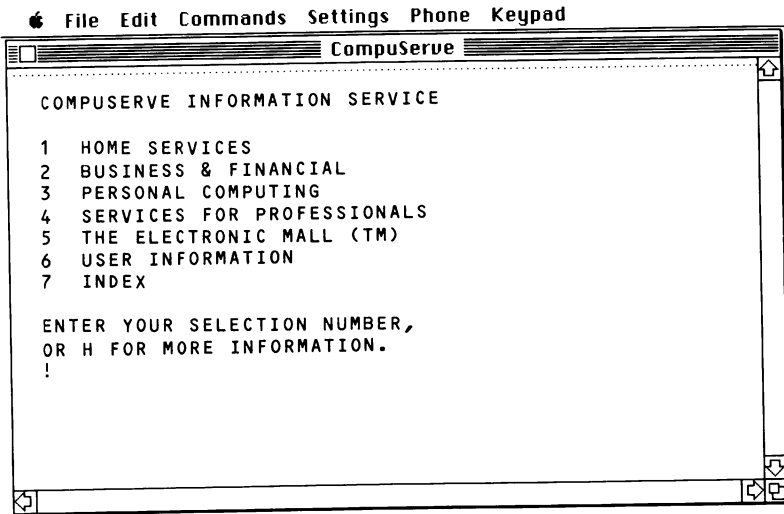


Figure 4-2. *CompuServe main menu*

To log off the system at any time, simply type **BYE** and press RETURN. The CompuServe log-off message will be displayed, followed by the length of time you were on-line.

```
OFF AT 20:26 PDT 22-SEPT-84
CONNECT TIME = 30:01
```

THE SOURCE

The Source, a subsidiary of the Reader's Digest Association, Inc., is another information service that you can access with the Macintosh. It also offers a full range of information, including electronic mail (called "SMAIL" or "Source-Mail"), bulletin boards, conferencing, general news from UPI, business news, magazines, personal-computing services, education services, and games. Nearly 1300 features in all are provided for your use.

The Source is accessible 24 hours a day, 7 days a week. You are charged a one-time sign-up fee and are billed by the hour for on-line time. There are three

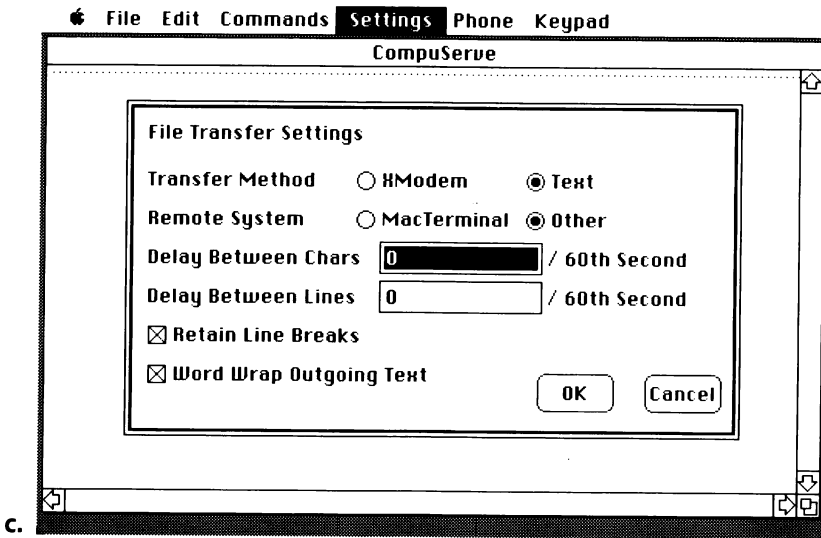


Figure 4-1. *CompuServe setup parameters (continued)*

If you make a mistake while entering either your ID number or password, CompuServe may have to repeat the entire procedure. The results of the process should look something like this:

```
01MCA
HOST NAME: CIS
USER ID: 70703,339
PASSWORD:
```

Once you have logged onto CompuServe, you will be presented with the service's main menu, similar to the one shown in Figure 4-2.

CompuServe's command prompt is **!**, which signifies that the information service is waiting for you to enter something. What you do next is up to you. You can "leaf" your way through the various menus by simply selecting menu options and pressing RETURN; or, if you have a specific purpose for being on-line and know where the information is located, you can go directly to that page by typing **GO** followed by a page number. (You can always return to the main menu shown in Figure 4-2 by typing **GO TOP** and pressing RETURN.)

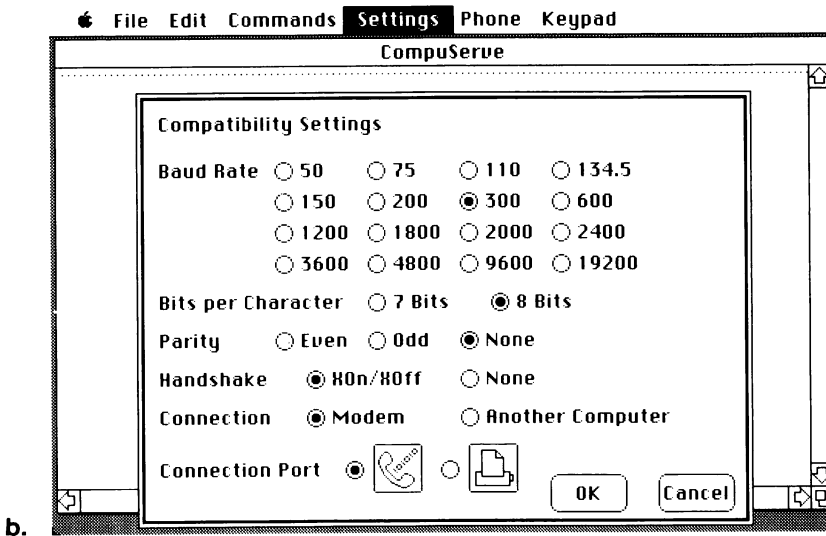
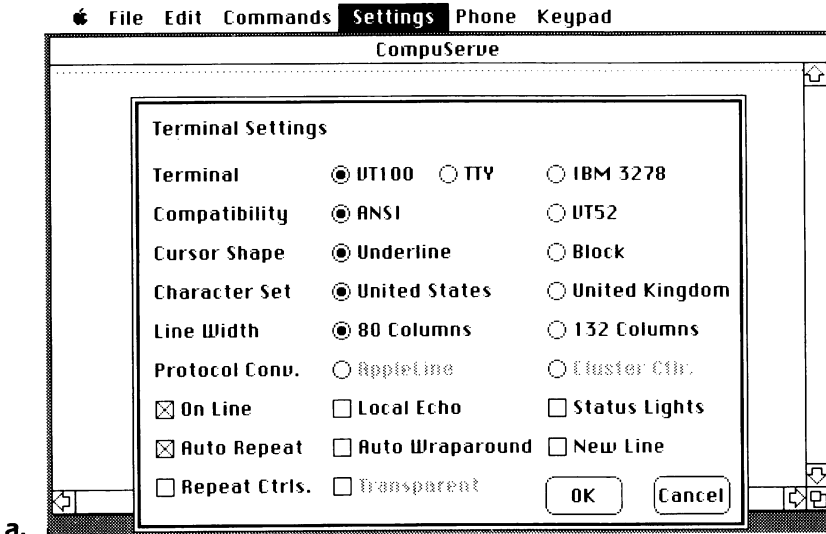


Figure 4-1. CompuServe setup parameters

If you want to know the current CompuServe rates, you can get them when you are on-line with the service. You can also request your current charges. Use of some special services (products or information) may incur additional charges.

When you buy an Apple modem, the package contains a CompuServe subscription form. If you subscribe to CompuServe, you'll receive a manual and an hour of free on-line time.

To learn more about this information service before subscribing, contact CompuServe at

CompuServe Information Service
5000 Arlington Centre Blvd.
Columbus, OH 43220
Phone: 800-848-8990 (in all states except Ohio)
614-457-8650 (in Ohio)

Setting Up a MacTerminal Document For CompuServe

If you intend to use the MacTerminal communications program to communicate with CompuServe, you must first set up a MacTerminal document. This document stores the necessary parameters (settings).

The required CompuServe communications parameters are: full-duplex, 300 baud, XON/XOFF enabled, 8-bit word length, parity bit zero (none), and 1 stop bit. (Special 1200-baud phone numbers are also available.)

MacTerminal settings for compatibility, terminal type, and file transfer methods required by CompuServe are shown in Figure 4-1.

Once you have opened a MacTerminal document, select each of the dialog boxes from the Settings option on the menu bar. After you have chosen the appropriate settings, enter the phone number (select Phone Settings in the Phone menu) and save the document under the filename "CompuServe" or "CIS" (select the Save As option from the File menu).

Logging Onto CompuServe

Once you have dialed CompuServe and the connection is made, press RETURN and a special code will appear, followed by the prompt **HOST NAME:**. Since CompuServe will be the "host," type **CIS** and press RETURN. Next you are asked for your identification number: **USER ID:**. Enter the number that CompuServe assigned to you when you subscribed to the service (for instance, **70703,339**), and press RETURN. Finally, CompuServe will ask for your secret password: **PASSWORD:**. Enter the correct password—carefully, since it will not be displayed on the screen—and press RETURN.

Most information services communicate with your computer at 300 baud. At that rate, about 30 characters will appear on your Macintosh screen every second. This may seem fast to you, but it's slow for computers; your Macintosh has the ability to communicate at over 2000 characters per second. However, few information services provide communication at this speed over standard telephone lines.

If you want a higher rate of communication, some services have 1200-baud telephone numbers. These are not as common as 300-baud numbers, and you may have to make a long-distance call to use one. The information service will probably charge more for 1200 baud than it does for 300 baud. Nevertheless, you may save money in the long run because it will take you less time to transfer large amounts of data.

Contact the network for the local number in your area. Before using this number, however, you'll have to connect a 1200-baud modem to your Macintosh and set your communications parameters to 1200 baud.

Three of the most widely used information services are CompuServe, The Source, and Dow Jones News/Retrieval. In many ways, CompuServe and The Source are alike. Both services provide general information in areas ranging from science to entertainment. But they differ in details and in the commands you must type on your Macintosh keyboard to get that information. On the other hand, Dow Jones is almost entirely devoted to financial information.

COMPUSERVE

CompuServe has a little of everything and something for everyone — newspapers, magazines, feature stories, sports and weather reports, CB simulators, bulletin boards, electronic mail (EMAIL), electronic shopping, and entertainment. Features are added almost weekly.

CIS (short for "CompuServe Information Service"), which is based in Columbus, Ohio, is on-line 24 hours a day, 7 days a week. However, there may be times after midnight (eastern standard time) when the system is shut down for system maintenance.

CompuServe charges you for the time you are on-line. For billing purposes, there are prime-service and standard-service hours.

- Prime service is from 5:00 A.M. to 6:00 P.M. Monday through Friday.
- Standard service is from 6:00 P.M. to 5:00 A.M. Monday through Friday and 24 hours a day on weekends and some holidays.

If you go on-line during standard hours but are still on-line when prime-service hours begin, the entire time you are on-line will be billed as prime time. (For a similar reason, always disconnect from the service by logging off first [type **BYE**]; then disconnect the phone and turn off your Macintosh system, or you will be billed for an additional 15 minutes.)

- Electronic shopping services
- Electronic banking services
- Games and entertainment.

For an information service to be really useful to you, it should be accessible through a local telephone number. (While some services are accessed only by long-distance numbers, any advantage they may offer is usually offset by higher telephone bills.) Most information services require a one-time registration fee. There are monthly charges, usually calculated by the amount of time you spend on the service. There may also be a base charge whether you use the service or not. The service can bill you directly or through a credit-card account like VISA or MasterCard.

With information services, as with long-distance phone calls, some hours of the day and days of the week are considered prime time, while others are not. Prime-time hours of use are roughly from 7:00 A.M. to 5:00 P.M. Monday through Friday (essentially regular business hours). Charges can run up to \$25 per hour for prime-time use—and for some services, several times higher than that. Non-prime-time hours of use are from 5:00 P.M. to 8:00 A.M. Monday through Friday and 24 hours a day on weekends and holidays. Non-prime-time access usually costs as little as \$5 per hour.

Almost all information services assign you a unique, secret password that allows you to gain access to the system. This password is to be known only to you and to the service. (Since anyone knowing your password can go on-line and charge hundreds or thousands of dollars' worth of expenses to your account, guard it just as you do your credit-card numbers.)

Once you're on-line, most information services are menu-driven: you're presented with a menu of several options, and choosing an option will take you either to another menu of choices or to the particular information you desire. If the information you want is "buried" under several menus, most of your connect time (and money) can be spent just getting to it. It is worth your while, then, to look in the index supplied to you when you subscribed to the service and find the "page number" where the information you want is stored. By entering the page number, you can go directly to that information.

The local number you must phone to access a particular information service may or may not be the service's number. If it is not, it is usually the number of a "telephone networking system" such as Tymnet, Telenet, or Uninet. These systems don't provide information themselves; they simply serve as a broker, or connection, through which information passes on its way to you. You may have to pay a fee for use of the network in addition to the standard information-service fees. Likewise, one information service can serve as an access "node" to another service. In such a case, you may receive two separate bills, one from each service, or a single bill from one service that has been billed by the other service and that passes these charges to you.

4

INFORMATION SERVICES

Once you have set up your Macintosh telecommunications system, you will be ready to dial up and go on-line with a database or an information service. Many services (such as CompuServe) can be called directly; others require that you first dial a telephone network (such as Tymnet) that will then connect you with a service. This chapter will describe a few of the most commonly used services and will show you how to log onto them.

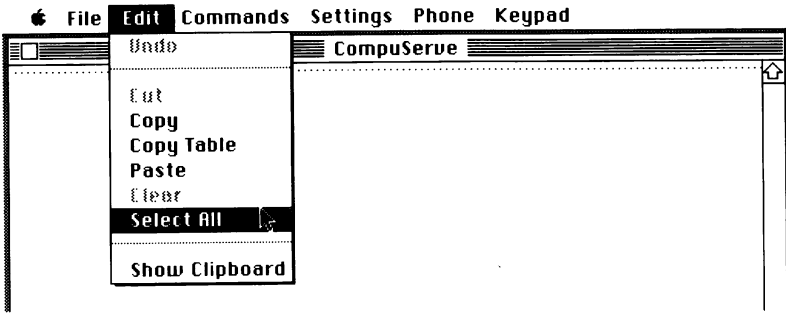
Computer-based information services can supply an almost unlimited variety and amount of information through a computer terminal. Usually all you need to access an information service is a computer (such as a Macintosh), a modem, a telephone, and a communications software package. You might also want a printer to print out information you receive and some means of auxiliary information storage, such as an additional disk drive.

The type of information and services you can get depends, of course, on the information service itself, but most offer

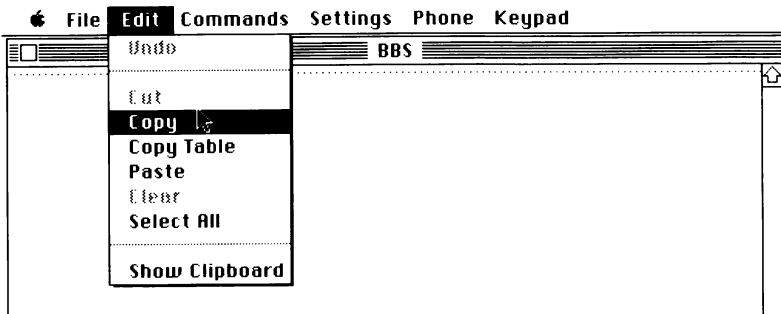
- Newspapers
- Reference materials
- Books and magazines
- Movie reviews

CONCLUSION

This chapter has introduced you to communications software in general and MacTerminal in particular. Individual software packages may have features that aren't described here; however, the information provided should help you evaluate your needs when deciding which program suits your requirements. In the same sense, MacTerminal has some features that haven't been discussed in this chapter. The information presented here, however, should cover at least 90 percent of your telecommunications needs.



Next, move the pointer up to the word Copy and then click the mouse once more:

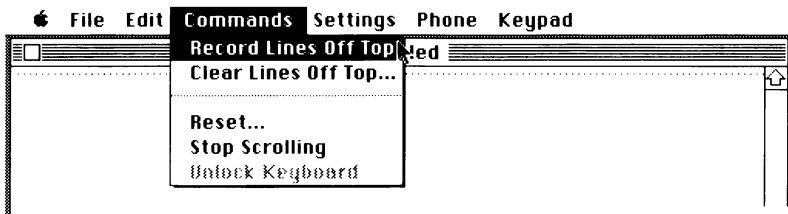


At this point, everything in the file that was previously saved will be copied onto the Macintosh Clipboard. You can then go back to the Commands menu (see Figure 3-24), move the pointer down to Clear Lines Off Top, and click the mouse. This will erase from your MacTerminal document any information recorded as it was scrolled off the top of the screen.

To use the information that is on the Clipboard, you can exit MacTerminal and load another application program (such as MacWrite). Once you have a MacWrite document open, simply move the pointer to the word Edit in the menu bar, and click the mouse to display the Edit menu. Next move the pointer to the word Paste and click the mouse. Any information on the Clipboard will be “pasted” into the open document. For more information on the Clipboard, see your Macintosh owner’s manual.

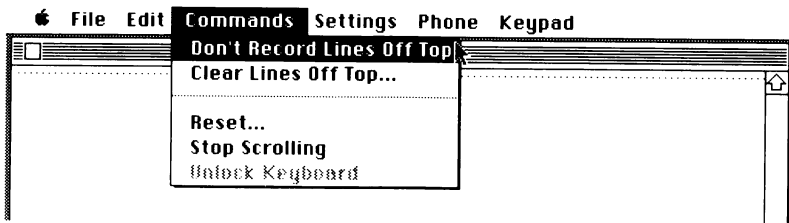
52 *MacTelecommunications*

and click the mouse until the message **Record Lines Off Top** is highlighted, like this:



From this point on, any information that scrolls off the top of the screen will be saved.

If you don't want to save the information, click the mouse until the message **Don't Record Lines Off Top** is highlighted, like this:



Usually, you will begin your telecommunications session by not recording information. When some information appears on the screen that you wish to save, move the pointer up to the menu bar and click the **Record Lines Off Top** message. Once all of the information you want saved has scrolled off the display, you can move the pointer back to the menu bar, select the **Commands** menu, and click the **Don't Record Lines Off Top** before continuing your communications session.

You will probably want to end your telecommunications session before you begin manipulating the saved data. Once you have gone off-line, but before you quit the MacTerminal document, move the pointer to the word **Edit** on the menu bar and click the mouse. When the **Edit** menu appears, move the pointer down to the **Select All** line and click the mouse again as shown.

application) document by copying the document to a disk that contains MacWrite. When you have the document on the appropriate disk, move the pointer to the non-Macintosh icon and click the mouse. It will then be highlighted. Next press and hold the SHIFT key, move the pointer to the MacWrite icon, and click the mouse again. Both icons should now be highlighted. Finally, move the pointer to the word File on the menu bar and click the mouse to display the File menu. Move the pointer to the Open option and click the mouse. The downloaded document will then be converted to MacWrite format.

The second method of downloading information from another computer involves the use of the Macintosh Clipboard. More specifically, MacTerminal gives you the option of recording or not recording information as it scrolls off the top of the screen. This information can be anything from electronic mail that is being displayed on-line to the log-on sequence of a specific information service.

To save information as it is displayed on your Macintosh screen, move the pointer to the word Commands on the menu bar and click the mouse. At that time, the Commands menu will appear (see Figure 3-24). The top line of the menu will say either Record Lines Off Top or Don't Record Lines Off Top.

To save information as it moves off the screen, move the pointer to the first line

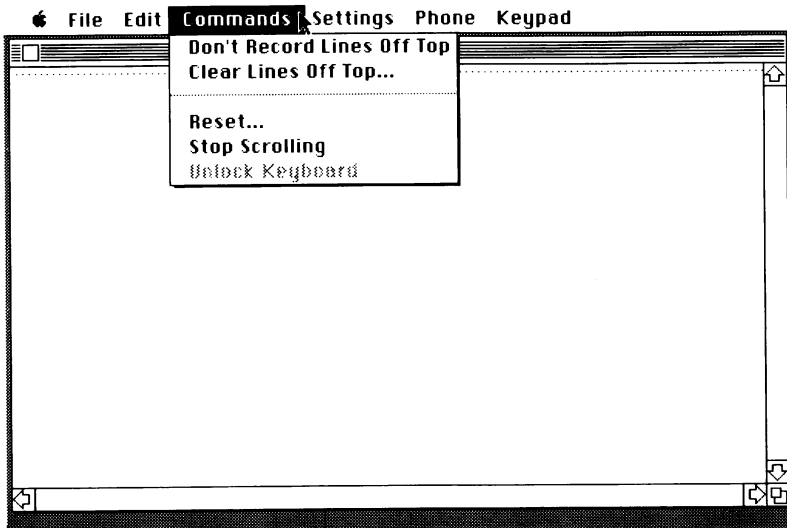


Figure 3-24. *The Commands menu*

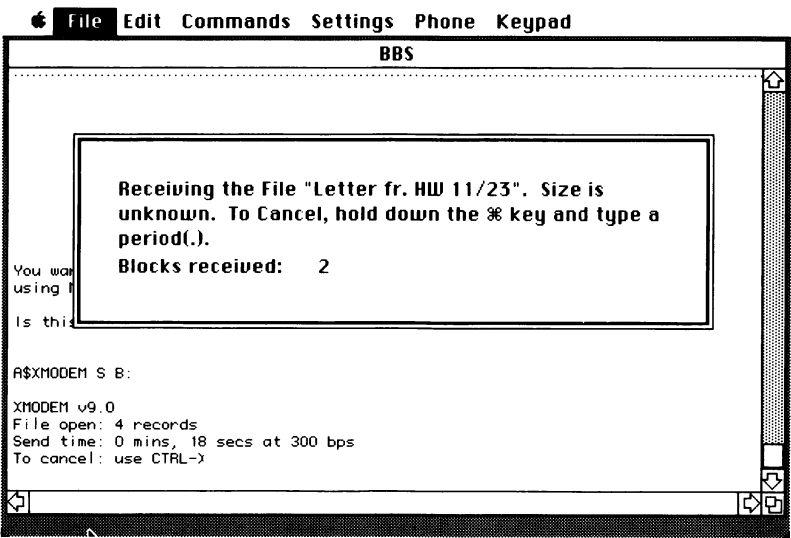




Figure 3-23. The Receive File progress window

file is completely downloaded, the program will return to the terminal screen. Files that are downloaded directly on disk will be listed on the MacTerminal desktop along with the other disk files. If the file was downloaded from a computer other than a Macintosh, the icon will look different from icons that represent files downloaded from Macintosh programs:

	
Letter fr. MH	Letter fr. AF
Icon of a letter sent from a MacWrite document	Icon of a letter sent from a computer other than a Macintosh or Lisa

You can convert non-Macintosh files to a MacWrite (or another Macintosh

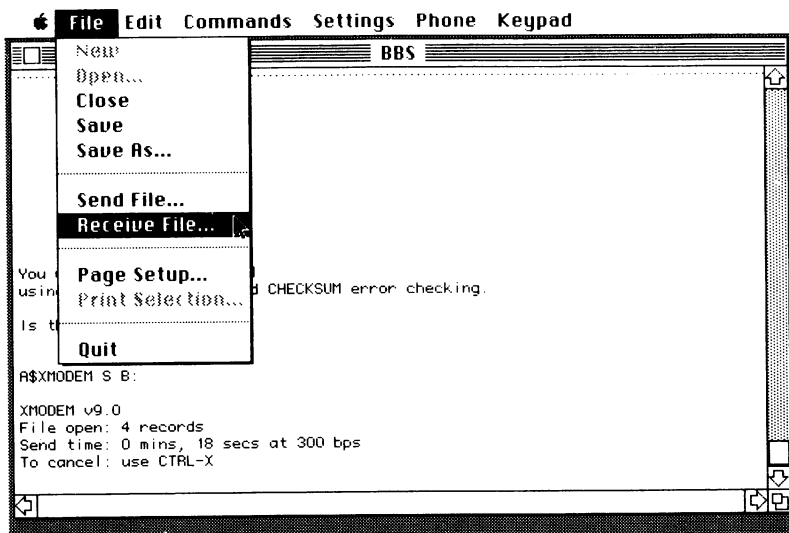


Figure 3-21. Selecting the Receive File option to download a file onto disk

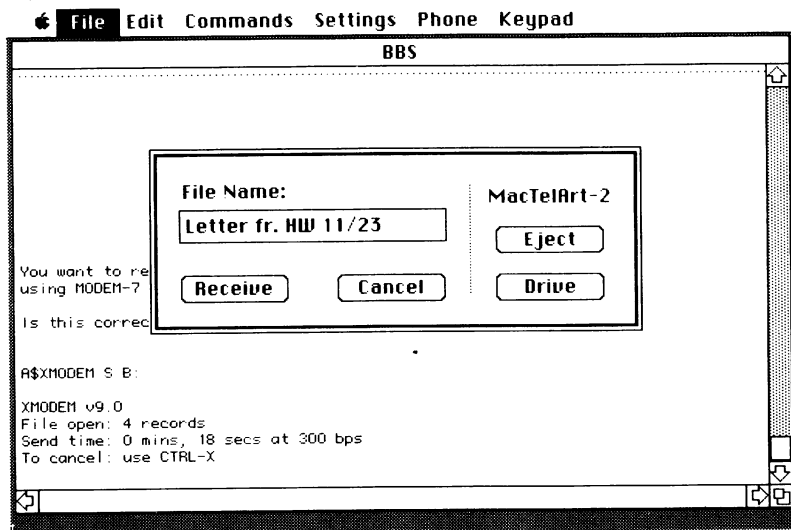


Figure 3-22. Assigning a name to a file that is to be downloaded

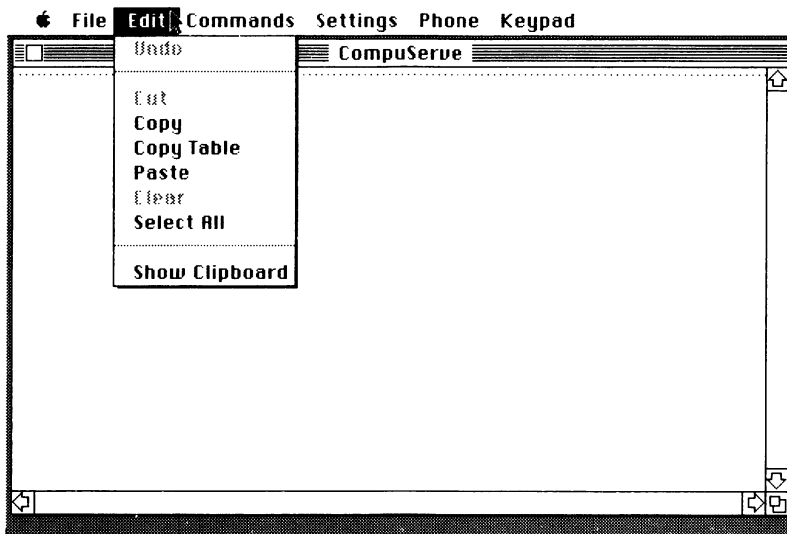


Figure 3-20. *The Edit menu (used for uploading from the Clipboard)*

are two ways to receive information into your Macintosh. One way is to receive the data directly into a separate disk file. The other method of file capturing is to save the information in your current MacTerminal document and copy it onto the Macintosh Clipboard for later use.

To download information directly into a disk file, move the pointer to the word File (on the menu bar) when the other computer is ready to send you information (see Figure 3-15). Once the File menu appears, move the pointer down to the words Receive File and click the mouse. The words will be highlighted, as Figure 3-21 shows. When this happens, a window that allows you to assign a document name to the file that is to be received will appear; just type in the name you desire. (It does not have to be the same name as that used to send the file.) Figure 3-22 shows that a file entitled "Letter from HW on 11/23" is to be downloaded. Additionally, you can specify the disk drive you want the file downloaded on if you have an external drive. To select another drive, move the pointer to the Drive box and click the mouse. The name of that disk will then be displayed.

Once the file name and drive are specified correctly, move the pointer to the Receive box and click the mouse; the downloading process will then begin. At that time, a window (like that in Figure 3-23) which indicates the progress of the file transfer will appear.

As the file is being downloaded, each file block is counted off as it is received. (A file block is simply a unit of measurement identifying the size of a file.) Once a

appear (see Figure 3-19). If the marker moves along the scale, the file is being sent; if the marker does not move, then a file transfer is not occurring (check for compatible File Transfer settings if this occurs). When the entire file has been sent, a message telling you so will be displayed and the program will return to the terminal screen.

A second method of uploading files involves sending information from the Macintosh Clipboard instead of from a disk file. The information can be copied onto the Clipboard in a number of different ways: from the Macintosh note pad, from a word processing program such as MacWrite, or from another applications program. In any event, whenever you are ready to upload information that is stored on the Clipboard, just move the pointer to the word **Edit** in the menu bar and click the mouse. The **Edit** menu, like that in Figure 3-20, will appear. Position the pointer to **Paste** and click the mouse; whatever is on the Clipboard will be sent. For specific information about the Clipboard and Note Pad, see your Macintosh owner's manual.

DOWNLOADING A FILE

Receiving a file from another computer (also called downloading or file capturing) is just the opposite of uploading. This process allows you to receive a letter, program, or other information from another computer. With MacTerminal, there

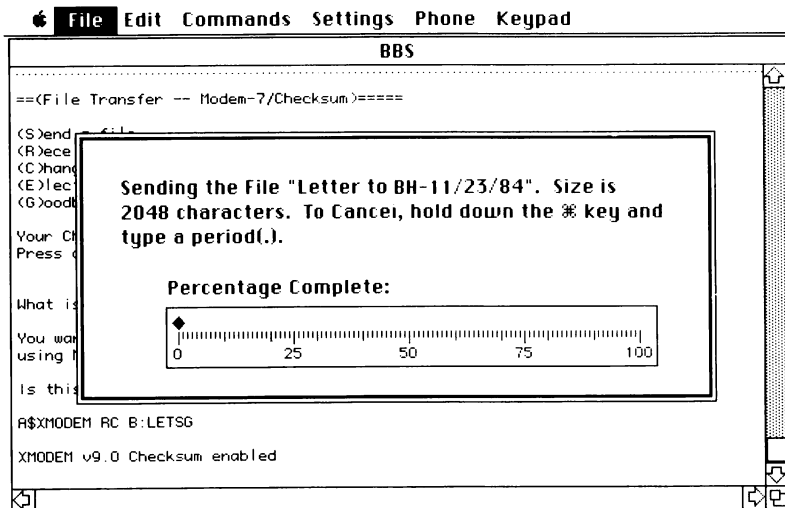


Figure 3-19. *The Send File progress window*

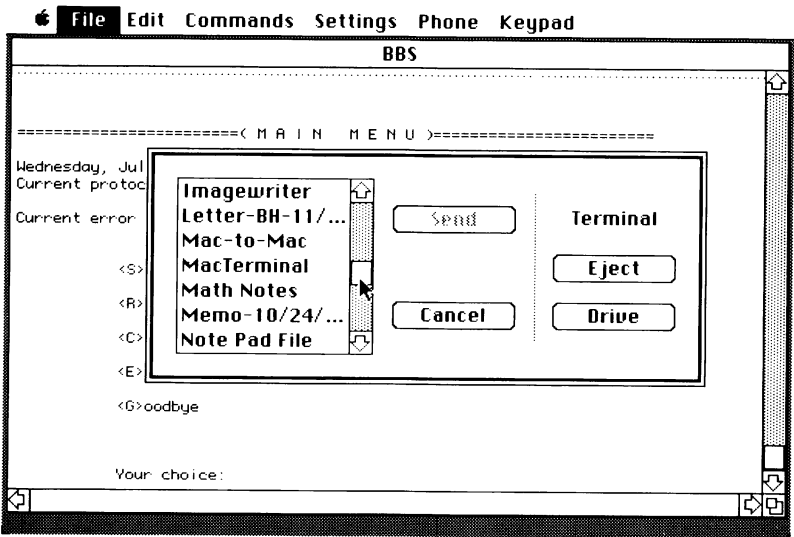


Figure 3-17. Displaying the disk directory before uploading a file

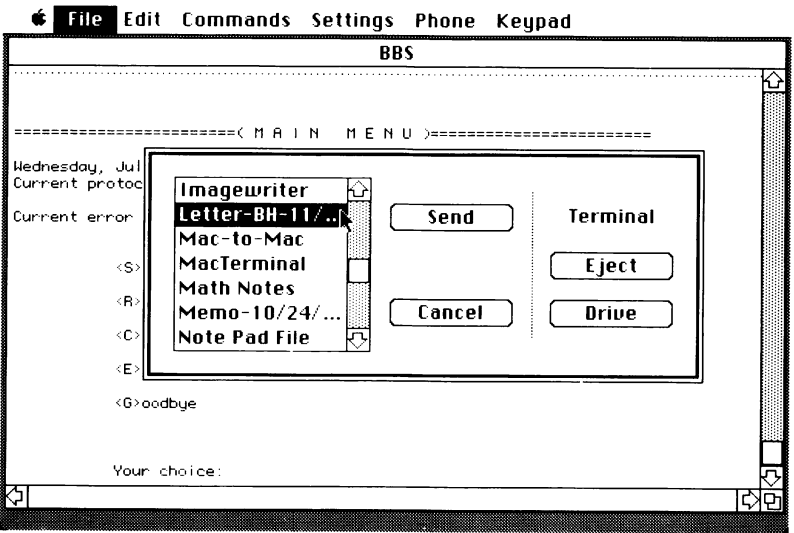


Figure 3-18. Selecting a file to upload

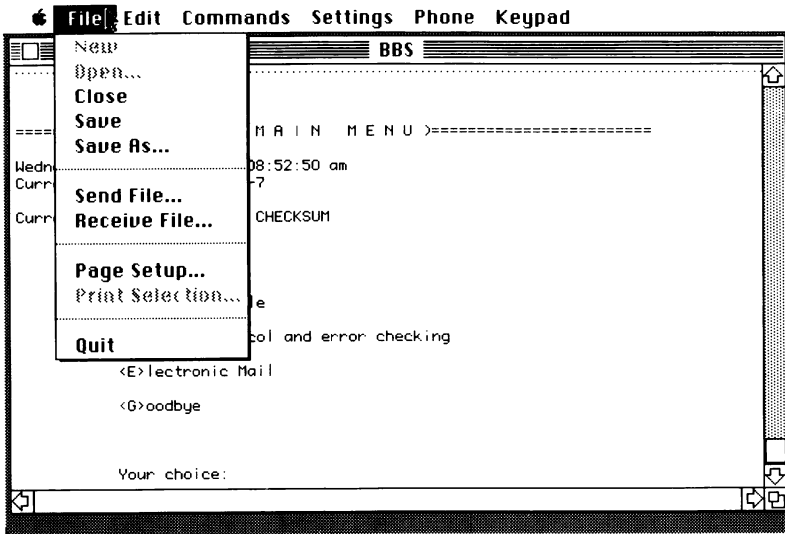


Figure 3-15. *The File menu*

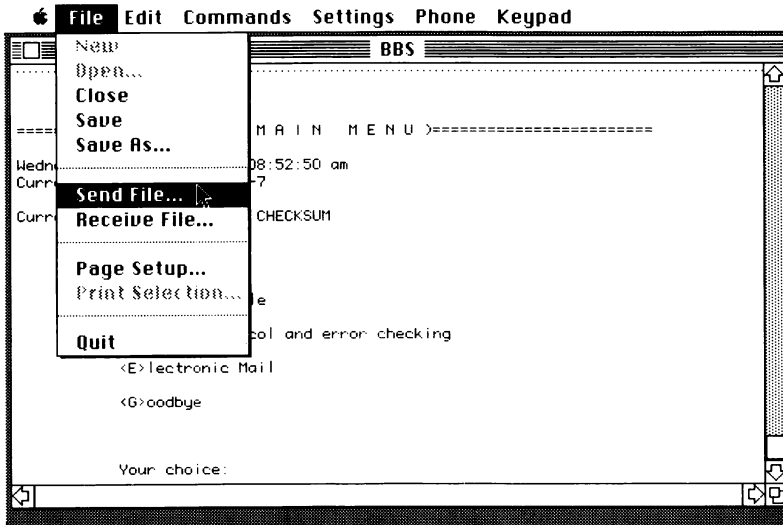


Figure 3-16. *Selecting the Send File (upload) option*

instances, you must first send a command that gets the modem's "attention." Next, you should tell the modem that you are going to "dial" a phone number, and finally, you should enter the number itself. All manual dialing occurs when the communications program is loaded and the terminal screen displayed.

If you are using an Apple modem, the dialing sequence is AT (for "attention"), D (to "dial"), then an optional P or T (for "pulse" or "tone" dial) followed by the number. For instance, you might type in any one of the following:

```
ATDT 555-4321
ATDP 1-(817)-555-3232
ATD 555-1111
```

The Apple modems also use a comma (,) to indicate a pause in the dialing sequence. Consequently, the following dialing sequence which is used to get an outside phone line would also be correct.

```
ATD 9,555-4411
```

There are many other modem commands that can be entered from the Macintosh keyboard once your communications program is in the terminal mode. As stated earlier, the specific commands depend on the modem you are using. See your modem's user's manual for more information. Also remember that modems other than Apple modems require a different dialing sequence.

UPLOADING A FILE

One of the most useful telecommunications applications is uploading (sending a file to another computer). MacTerminal allows you to send files two different ways: directly from a previously created disk file or from the Macintosh Clipboard. This section will describe both methods.

Before beginning to upload files, be sure your File Transfer Settings (see Figure 3-6) match those of the other computer. Specifically, if the other computer is using XMODEM protocol, you must use it.

When you are on-line with another computer and ready to upload a file, move the pointer to the word File on the menu bar and click the mouse. Once you do, a menu like that in Figure 3-15 will appear. Next, move the pointer down to the words Send File and click the mouse again (refer to Figure 3-16).

After you have clicked the mouse, the disk contents will be displayed in a window. If you don't see the file you want to upload, move the pointer onto the scroll bar so that additional file names will scroll up (see Figure 3-17). When you see the file you want to send (in this case, a file named "Letter-BH-11/"), position the pointer on top of the name and click the mouse. As Figure 3-18 shows, that file name will be highlighted.

To upload the selected file, next move the pointer to the Send box and click the mouse. A window containing a scale indicating the file transfer progress will then

DIALING ANOTHER COMPUTER

To establish a telecommunications link, you must first dial the other computer's phone. There are two ways to "dial" another computer from within a MacTerminal document. One method is totally automatic as long as the phone number has been previously stored in a MacTerminal document. All you need to do is position the pointer and click the mouse. The second method enables you to dial a phone by typing in the number on the Macintosh keyboard. The precise procedure for this depends on the type of modem you are using.

To call the other computer automatically, assume that the MacTerminal desktop shown in Figure 3-13 is displayed. First, position the pointer on the BBS icon and double-click the mouse. After a few seconds, the document will be loaded and the BBS terminal screen displayed. Move the pointer to the word Phone on the menu bar and click the mouse. When you do so, the Phone menu will appear; position the mouse to the word Dial (see Figure 3-14) and click the mouse again. A message telling you that the phone number is being dialed will appear. If you are using an Apple modem or other modem that has a built-in speaker, you will hear the dialing sequence. MacTerminal will dial the phone number you specified in the Phone Settings box when you created the document.

When the other computer answers the phone, you will hear a high-pitched tone over the modem's speaker and you will be on-line with the other computer. What you do after that depends on the other computer. Typically, you should press RETURN twice and the other system will send you a message. If you are communicating with an information service like CompuServe, a prompt such as **Host Name?** will appear. See Chapter 4 for details about logging onto such services as CompuServe, The Source, and Dow Jones. If the other computer does not answer the phone or if it is busy, move the pointer to the Cancel box and click the mouse.

At times, you may want to dial the other computer "manually" by typing on the keyboard. The specific procedures for manual dialing depend on the modem you are using, since modem commands are unique to individual modems. In most

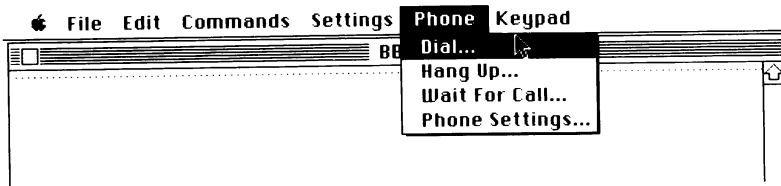


Figure 3-14. The Phone menu used to dial phone numbers

Since the blinking cursor is sitting in the name box, you can begin typing in the name you want assigned to the document. If you have just created a document for communication with CompuServe, for instance, you might entitle it “CIS” or even “CompuServe”. When you have typed in the name, press RETURN or move the pointer to the Save box and click the mouse. The terminal screen will then reappear.

At this point, you can return to the Macintosh desktop, where your document will be listed along with the other documents on the disk. Figure 3-13 illustrates a sample MacTerminal document saved under the name of BBS (for “bulletin board system”). Note what a MacTerminal document icon looks like.

Using a MacTerminal Document

Once you have created and saved a MacTerminal document, you can begin using it. This section will describe a few of the most common MacTerminal procedures: dialing the phone and transferring files (uploading and downloading). In the following examples, assume that you have set up a MacTerminal document named BBS (for “bulletin board system”). Figure 3-13 shows a MacTerminal desktop that includes this sample document.

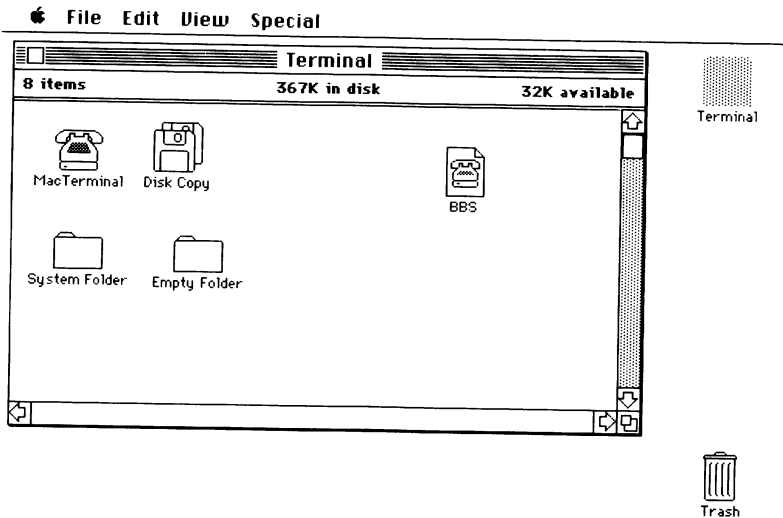


Figure 3-13. *Macintosh desktop with sample Mac Terminal document (BBS)*

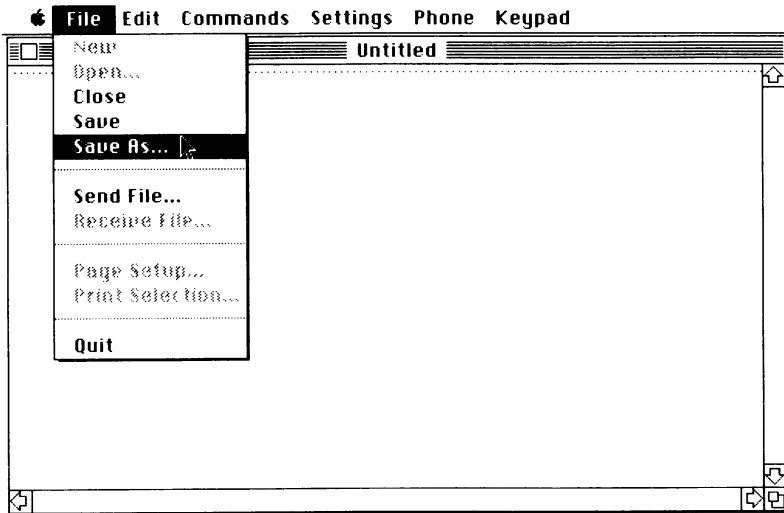


Figure 3-11. Selecting the Save As option to name a document

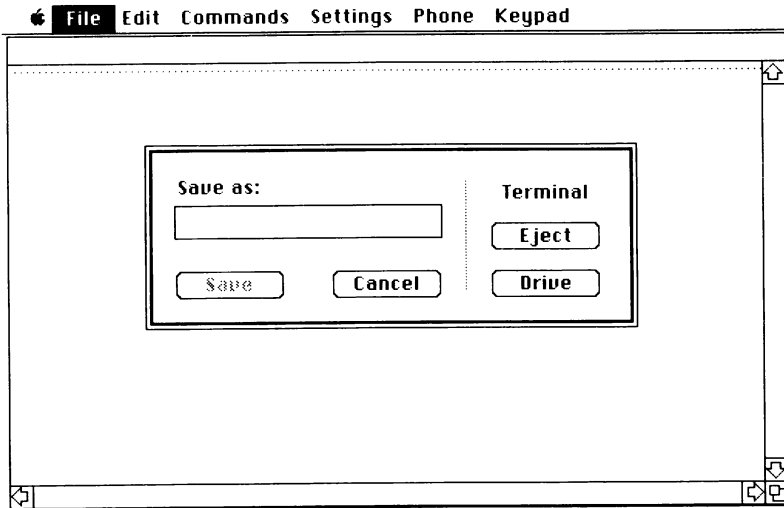


Figure 3-12. The Save As dialog box used to assign a name to a document

If you are using either of the Apple modems, position the pointer over the appropriate circle and click the mouse. If you are using any other modem (such as a Hayes SmartModem), move the pointer to the last circle before clicking the mouse.

When all of the Phone Settings are set to your document's requirements, move the pointer to the OK box and click the mouse. The terminal screen and menu bar will then return.

Saving Your MacTerminal Document

By now, you should have entered all of the information required by MacTerminal to begin telecommunications. The only thing remaining is to assign a name to your untitled MacTerminal document and save it on your MacTerminal disk.

To save the document, the terminal screen and menu bar must be displayed (see Figure 3-2). Move the pointer to the File option and click the mouse. When you do so, a menu like that in Figure 3-10 will appear. This time, move the pointer down to the Save As option (see Figure 3-11) and click the mouse again. When you do so, a dialog box like that in Figure 3-12 will appear.

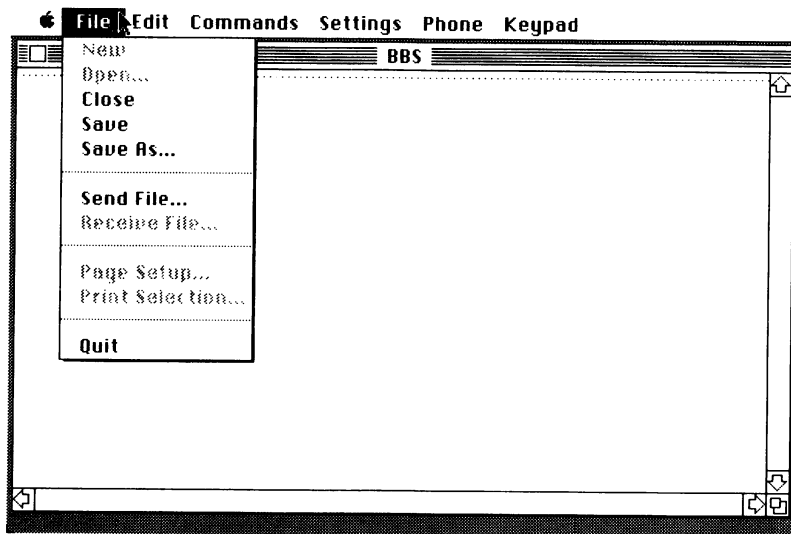


Figure 3-10. *The File menu used to save, transfer, and assign names to documents*

following phone numbers are valid uses of the pause symbol:

Phone Number

9,1-817-555-1234

Phone Number

9, 555-4433

Phone Number

9, 1-(415)-555-4321

Once you have entered the phone number of an information service or computer, you can then specify whether your phone line is tone dialed or pulse dialed (or a combination of the two).

Dial ☒ **Tone** ☐ **Pulse** ☐ **Mixed**

Even if you have a push-button phone, don't automatically assume that you have a tone-dialed phone line. Push-button phones are sometimes connected to pulse-dialed phone lines. If you have any questions about which type of phone line you have, call your local telephone service. Once you know what type of phone line you have, move the pointer to the appropriate circle and click the mouse.

At times, the other computer may be "off-line." (The system operator may be performing a maintenance routine, for instance.) In such instances, the phone may continue to ring even though the computer will not "answer" it. If it doesn't answer after three or four rings, it probably won't answer at all. Consequently, you might want to set the Number of Rings Before Answer box to 3 or 4.

Number of Rings Before Answer

3

To change the number of rings, simply position the pointer over the box and click the mouse; then type in another value.

Now you must tell MacTerminal what kind of modem you are using.

Modem ☐ **Apple 300** ☒ **Apple 1200** ☐ **Other**

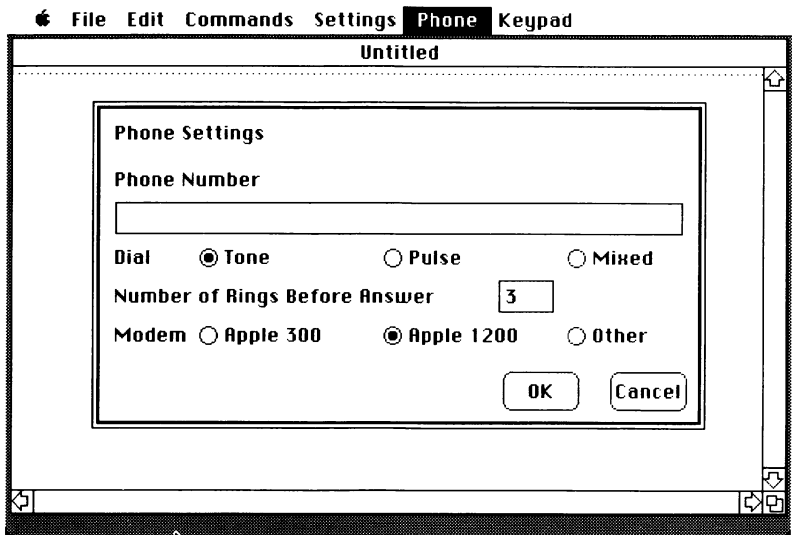


Figure 3-9. *The Phone Settings dialog box*

For instance, type a phone number like this:

Phone Number

555-1234

Notice that you can include hyphens in the phone number. You can also include parentheses around area codes, like this:

Phone Number

1-(314)-555-4321

The only characters MacTerminal recognizes when dialing a phone number are numbers and “pause” symbols; all others will be ignored. “Pauses” and the prefix 9 are sometimes required for dialing through a switchboard. With MacTerminal, a comma (,) indicates a pause in the dialing sequence. All of the

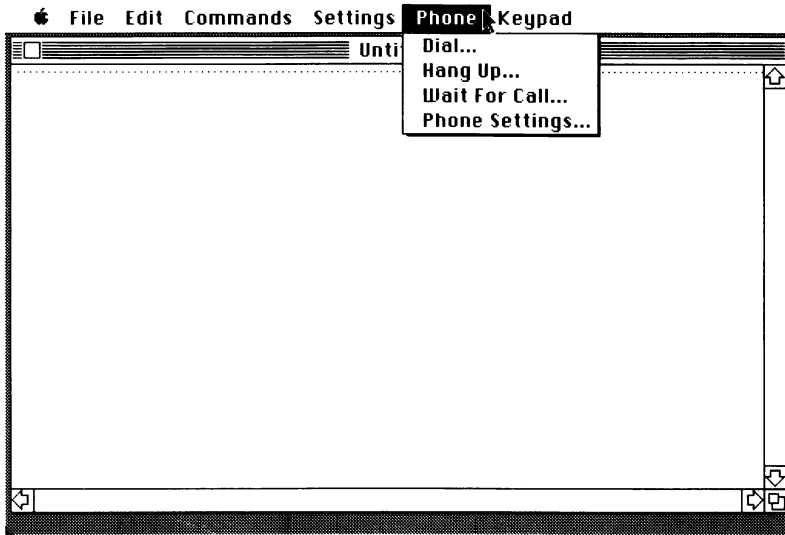


Figure 3-8. *The Phone menu*

Setting Up the Phone

Once you have set the Compatibility, File Transfer, and Terminal options, you should move the pointer to the word **Phone** on the menu bar and click the mouse. The Macintosh display will then display the Phone menu (Figure 3-8). When you are setting up your MacTerminal document, this menu allows you to type in the phone number of the computer you wish to telecommunicate with for auto-dialing. After you have entered the phone number and specified other options, you use this menu when dialing the other computer.

With the Phone menu on the screen, move the pointer down to the **Phone Settings** option and click the mouse. The Phone Settings dialog box (shown in Figure 3-9) will appear. You can immediately begin typing the phone number, and it will be entered into the box below the words "Phone Number."

Phone Number

may have to set the Terminal setting to either TTY or IBM 3278. Check with the system operator of the other computer to be sure. This goes for the Compatibility setting (ANSI or VT52) as well. Chapter 16 provides more details on communicating with a mainframe computer.

When you start up MacTerminal, the terminal screen displays an underline cursor. If this is difficult for you to see, or if you prefer a blinking block cursor, select the appropriate Cursor Shape circle.

Most information services communicate at 80-character column widths. However, some mainframe and other computers do occasionally send data formatted for 132-character columns. If you are communicating with a computer that does, select the 132 columns option after Line Width.

If, in the first line of the dialog box, you indicated that you wanted to emulate an IBM 3278 terminal, you can then specify that you want to use the Protocol Conventions for Appleline or Cluster Controller (Apple's micro-to-mainframe adapters).

The On Line option allows you to cease on-line communication with another computer so that you can do something else without going off-line. For instance, you might want to create a MacWrite document to send via MacTerminal without being disconnected from the other computer. If so, display the Terminal Settings dialog box during communications and "uncheck" the On Line option. You can then load the MacWrite program and create your file. Be aware, however, that some services will automatically disconnect you from their computer if you do not communicate with it within a specified time period. In most instances, you will want the On Line option "checked".

Local Echo is similar to duplex settings (described earlier in this chapter). To simulate full-duplex, leave Local Echo "unchecked"; to simulate half-duplex, "check" the box. If the other computer is *echoing* a character (most do with full-duplex communication) do not check the box. If the other computer does not echo, check the Local Echo box.

The Status Lights options are sometimes useful when you are communicating with a DEC VT100 terminal. For most applications, you will not need to check this box.

When you first start up MacTerminal, the Macintosh will not generate (or send) characters repeatedly if you hold down a key. If you need this feature, check the Auto Repeat box. If you want to control characters to be repeated, check the Repeat Ctrl's. box at the bottom of the screen.

Automatic wraparound means that a new line will begin at the left screen margin when the right screen margin is reached. This is usually preferred (that is why it is the default value). If you "uncheck" this box, lines will be displayed on top of each other.

Finally, the New Line option sends a carriage return and a line feed to the other computer. If you want to send only a line feed, leave this box "unchecked."

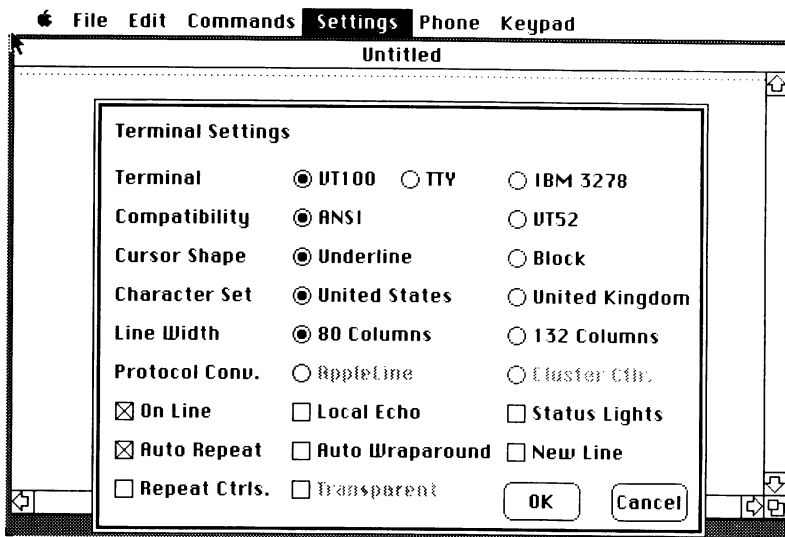


Figure 3-7. *Terminal Settings dialog box*

different values until data is transferred reliably.

The next option, Retain Line Breaks, is used when you are receiving files from another computer. Some files sent from another computer may end each line of text with a carriage return, while other files may not have a carriage return until the end of the paragraph. For some applications, you will want to keep the carriage-return characters in the file your Macintosh is receiving; in other cases, you will not want it. MacTerminal will “throw away” the carriage-return character if the Retain Line Breaks box is not checked; otherwise, the carriage return will be kept in the file.

TERMINAL SETTINGS

Figure 3-7 illustrates the final dialog box accessed from the Settings option on the menu bar: Terminal Settings. This dialog box allows you to set up your Macintosh to “emulate” another computer. When a microcomputer communicates with a mainframe, the keyboard and special codes may not be compatible. This box lets your Macintosh “act like” another type of terminal. For most general telecommunication purposes, you can leave the Terminal setting to the default value: VT100. However, if you begin communicating with a mainframe on a regular basis, you

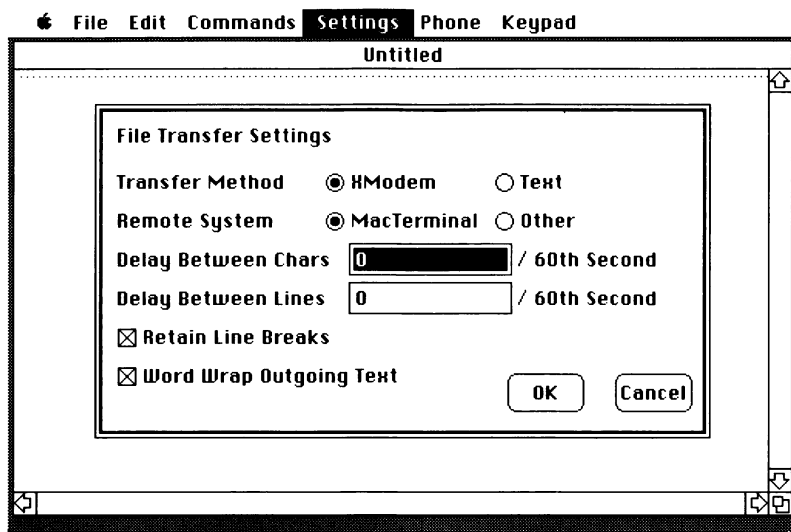


Figure 3-6. *File Transfer Settings dialog box*

communications program other than MacTerminal, or if the other computer is not a Mac, select the Other option.

At times, information is sent to or from your Macintosh faster than either computer in the system can process it. If this situation occurs, information can be lost or garbled during transfer. Generally, the Handshake option, which is accessed through the Compatibility dialog box (see Figure 3-5), allows you to control the flow of data from one computer to the other. However, if one computer is using XON/XOFF, both computers must use it, and some remote computers (particularly mainframes) simply don't have flow-control features.

There still may be times when the other computer cannot receive the data as fast as your Macintosh can send it. However, you can control the flow or speed of information. The Delay Between Characters and Delay Between Lines options let you put a pause between individual characters and lines (a line is measured from one carriage return to another) as they are sent from your Macintosh. To enter a pause between characters, simply type in the new value. To enter a delay between lines, move the pointer to the Delay Between Lines box and click the mouse; then type in a new value. Typical delays are 1/60th of a second. Electronic mail features of bulletin board systems often require a delay between lines. In both instances, you will have to check the other computer's requirements or experiment with

In virtually every telecommunications session, you will have the modem connected to the modem connector on the back of the Macintosh. Therefore, select the modem icon (the one that matches the telephone icon on the rear of the computer). If you have connected a computer directly via the printer port, select the printer icon. (Apple does not recommend this.)

When all parameters are compatible with the other computer, position the pointer to the OK box and click the mouse (or press RETURN). The Compatibility settings will then become a "permanent" part of the MacTerminal document.

FILE TRANSFER SETTINGS

Ensuring that your communications parameters are compatible with the other computer makes communications possible. However, you will probably also want to send or receive electronic mail, spreadsheet data, programs, and so on, during a communications session. Typically, information is sent from your Macintosh Clipboard or from a file previously stored on disk. On the other hand, information can be received into your MacTerminal document or stored directly as a disk file. Consequently, the process of sending or receiving information is referred to as "file transferring." Before you can exchange files with another computer, however, you must be sure that both computers are using the same file transfer method. The File Transfer Settings dialog box (shown in Figure 3-6), which is accessed from the Settings menu, lets you set up your MacTerminal document to send and receive files.

The two options that let you specify a file transfer method are XMODEM and Text. XMODEM is a special error-checking scheme that allows for more reliable data transfer than is usually possible. In fact, there is a 95 percent chance that all information will be transferred from one computer to the other without errors when you use the XMODEM option.

Although the XMODEM file transfer method does ensure a high degree of accuracy, it does require that if you use it, the other computer must be using it as well. XMODEM is ideal if you are transferring graphics files or formatted text files that are unique to the Macintosh (MacWrite files with special character fonts, for example) between two Macintoshes. Remember: if one computer is using XMODEM protocol, both computers must use it. Furthermore, the XMODEM protocol requires that you use a word length of 8 and set parity to none. Note that XMODEM and XON/XOFF enabled (see Handshake in Figure 3-5) should not be used at the same time.

The other file transfer option, Text, does not provide any special error-checking. Consequently, it should be used to transfer standard ASCII files between two computers. If you are transferring data between a Macintosh and a mainframe, you will more than likely use the Text method.

When the other computer (referred to as the "Remote System" in the File Transfer Settings box) is another Macintosh (or Lisa) using MacTerminal, select the MacTerminal option. If the other computer is a Macintosh using a

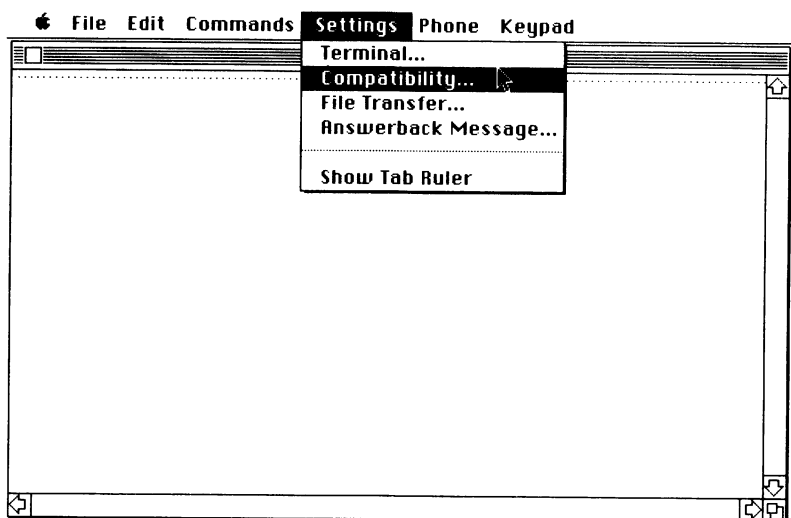


Figure 3-4. Selecting the Compatibility option to set communications parameters

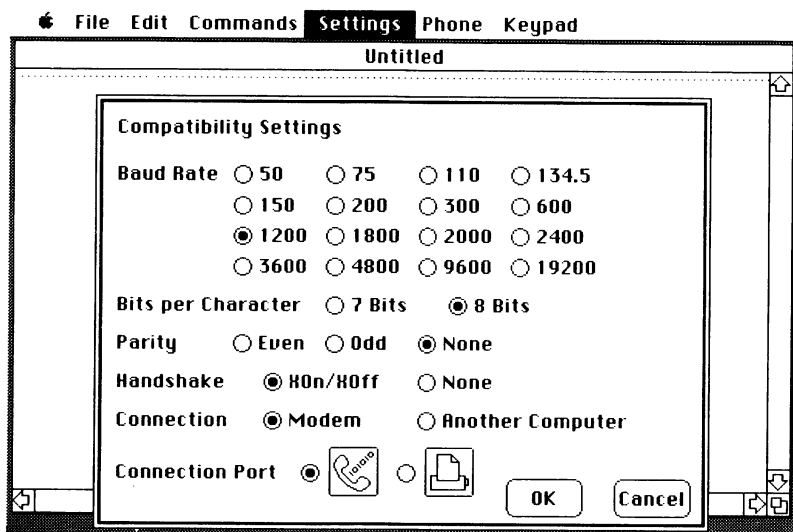


Figure 3-5. Compatibility dialog box

more. Begin by selecting the Compatibility option to set the communications protocol.

COMPATIBILITY SETTINGS

Earlier, we mentioned that it really doesn't matter what communications parameters you and the other computer use as long as the two settings are compatible (the same). The Compatibility option lets you establish these compatible parameters.

To begin setting the parameters for your document, move the pointer to the word Compatibility (see Figure 3-4) and click the mouse; the Compatibility dialog box (like the one in Figure 3-5) will appear. When you first use MacTerminal, you will notice that it has default or preset parameters. Those parameters are: 1200 baud, 8-bit word length, no parity (none), and XON/XOFF enabled. Additional settings (as Figure 3-5 shows) include direct connection to another computer via the modem connector on the back of the Macintosh.

To change any of these settings, simply position the pointer to the desired setting and click the mouse button. For instance, if you want to change the baud rate to 300, move the pointer so the box looks like this:

Baud Rate ☐ 50 ☐ 75 ☐ 110 ☐ 134.5
 ☐ 150 ☐ 200 ☐ 300 ☐ 600
 ☒ 1200 ☐ 1800 ☐ 2000 ☐ 2400
 ☐ 3600 ☐ 4800 ☐ 9600 ☐ 19200

Now click the mouse and the dot will appear in the circle beside 300. Most of the other MacTerminal settings are selected the same way.

The most common baud rates you will use when telecommunicating with information services are 300 and 1200. Normal telephone lines cannot transmit information reliably at higher speeds. However, when two computers are directly connected to each other with a cable, baud rates in excess of 1200 can transmit data safely.

Although the Compatibility dialog box lists only the parity settings of even, odd, and none, some computer systems require either "mark" or "space." If you need to communicate with such a system, first try setting Parity to none. If that doesn't work, try setting Bits per Character to 8 with Parity set to none, or set Bits per Character to 7 and Parity to even.

If the other computer is using XON/XOFF, be sure and set the Handshake option accordingly.

By definition, telecommunications require that your Macintosh be connected to a modem. Consequently, choose modem as the Connection option. If your Macintosh is connected directly to another computer (that is, a modem is not used), select the option Another Computer.

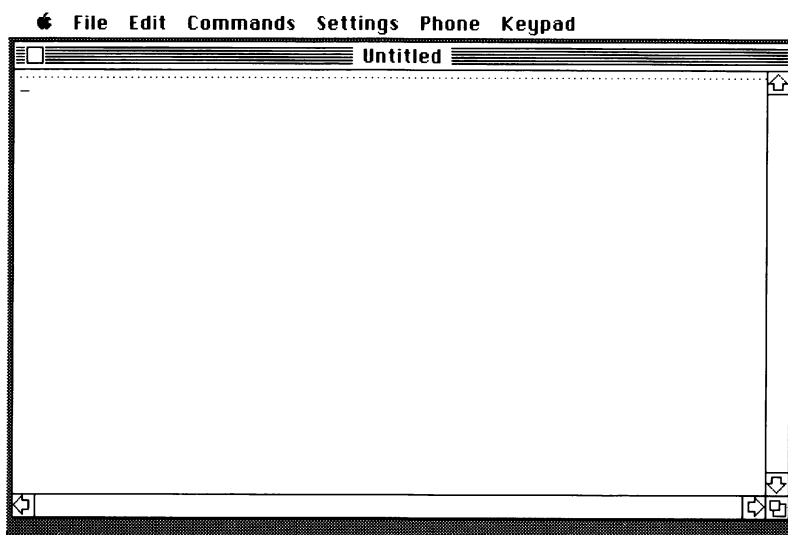


Figure 3-2. *Terminal screen*

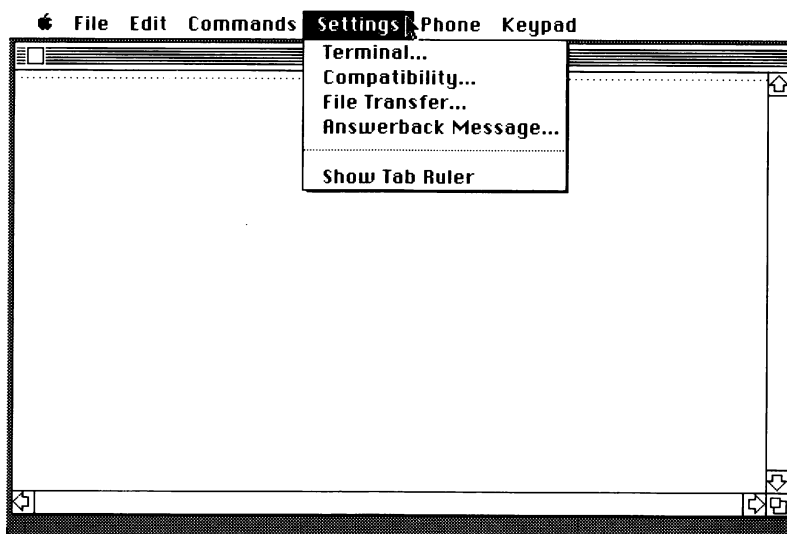


Figure 3-3. *The Settings menu*

up to communicate with CompuServe, another with The Source, and a third with an IBM mainframe at a nearby university. If the CompuServe document is set up for 300 baud and the IBM document for 1200 baud, all you have to do is “close” the CompuServe document and “open” the IBM file to begin another session—without resetting any parameters. A MacTerminal document can also contain the telephone number of the other computer (for auto-dialing).

When you first insert the MacTerminal disk into either the built-in disk drive or an external drive, the MacTerminal desktop appears (see Figure 3-1). From this desktop, you create a MacTerminal document before beginning a telecommunications session. The rest of this chapter explains this procedure and others. Note that this chapter will explain how to use the basic features of your MacTerminal program. There are many program features that you will probably never use; consult your MacTerminal user’s manual for details on these.

Opening a MacTerminal Document

The first time you use the program, you will have to set up a MacTerminal document. To do this, move the pointer to the MacTerminal icon:



MacTerminal

When the pointer is on the icon, double-click the mouse, and the MacTerminal “terminal screen” will appear on the desktop window (refer to Figure 3-2).

There are several things you should notice about this screen. For starters, look at the menu bar. Notice that in addition to the familiar Apple, File, and Edit options, the menu bar also includes selections for Commands, Settings, and Phone. Each option and the menus it provides will be described in this chapter. Also notice that for now the document is named “Untitled.” You will assign a title to the document later when you save it. Typical titles for selected information services might be “MCI Mail,” “CompuServe,” “DJNS,” or “The Source.” In any event, the menu selection you should choose first is the Settings option. This selection lets you set up the communications parameters for the document you are creating.

Setting Up the MacTerminal Document

When you select the MacTerminal Settings option, the Settings menu (like that in Figure 3-3) will appear. From this menu, you can access the dialog boxes that let you set the communications parameters, specify the file transfer methods, and

automatic dialing, and so on. Furthermore, MacTerminal offers advanced features that are not available with some terminal packages. And, like most Macintosh application programs, all of these features are available from “pull down” menus (accessed from the menu bar at the top of the screen) and the dialog boxes produced by the menu. These menus and dialog boxes can be accessed even while you are communicating with another computer, and you will not be disconnected.

If you are familiar with communications programs, you will notice the difference with MacTerminal right away: it is document-oriented. This simply means that all communication with another computer takes place from within an individual file (called a document). This file contains all of the information you need to communicate with another computer. Furthermore, information from the other computer can be stored within the document (although it doesn't have to be).

Most communications programs require you to perform certain “housekeeping” tasks (parameter setting, and so on) every time you begin communicating with an information service. Later, if you decide to communicate with another service that has different parameters, the protocol must be changed. With a MacTerminal document, this isn't necessary. Since MacTerminal is based upon individual documents, each with its own specific protocol, you don't have to change the parameters each time you begin communicating with a different computer; you change documents instead. For instance, one document may be set

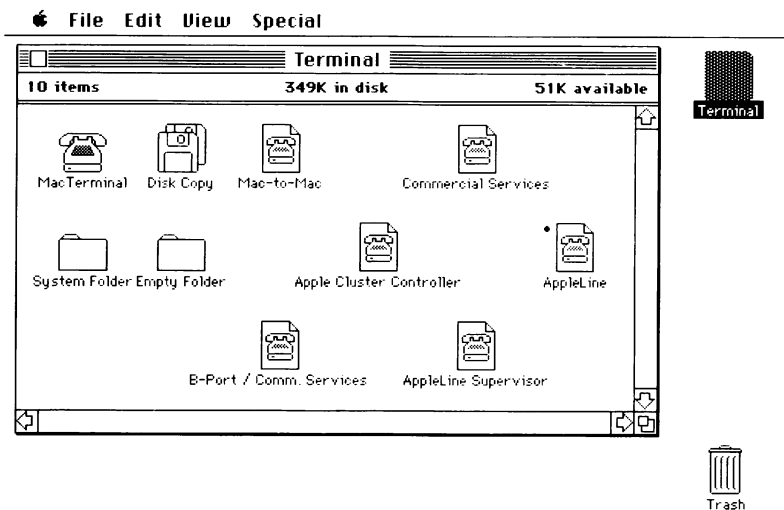


Figure 3-1. *MacTerminal desktop*

Automatic Dialing

If your modem supports auto-dialing (the Apple modems do), you may want to use a program that stores phone numbers and automatically dials another computer's phone.

Software Selection of Modem Capabilities

Many communications software packages allow you to select protocol or modem features from the keyboard instead of moving switches on the modem itself. These include baud rate selection, duplex selection, and most of the other features previously mentioned.

Help Files

Many software packages have "help" files that let you simply type **HELP** or ? when you have a question about commands or features. This saves you the trouble of keeping the manual next to you at all times.

Directory Access

When uploading or downloading files, you often need to know how much space is available on the disk as well as the name of the files currently stored there. Many communications packages have the capability of displaying a disk's directory and free space.

THE MACTERMINAL COMMUNICATIONS PROGRAM

MacTerminal is one of the more readily available communications programs written for your Macintosh. While there are several Macintosh communications programs on the market, MacTerminal is the one you probably will find the most convenient to use because of the way it makes use of the Macintosh's unique features.

To use MacTerminal, you will need a modem (we suggest either the Apple 300 or 1200 modem) and a cable from the modem to the computer. An additional disk drive isn't required, but it makes using the system much easier. (Chapter 2 describes specific hardware requirements.)

MacTerminal provides most of the features required of a useful communications program. This includes protocol selection, uploading and downloading,

computer then stores the data in another area of memory or on disk. When the buffer is sufficiently “low,” your computer sends a signal to the other computer that tells it to begin sending data again. This on-off sequence may occur many times during a communications session, especially when large files are being transferred.

COMMUNICATIONS SOFTWARE FEATURES

Like modems, communications software comes in both basic and enhanced versions. The minimum software package includes *protocol* instructions. The enhanced programs allow your Macintosh system to dial a phone number automatically, *download* (receive and store on disk) a file or program from another computer, or *upload* (send) a file or program to a distant computer.

Many of a communications program’s features should be considered mandatory, while others are enhancements that make the program more useful to you. This section will describe some of these basic features and enhancements.

Communications Protocol And Parameter Settings

Some specialized communications programs have preset communications parameters so that you cannot change the baud rate, word length, parity, XON/XOFF, or start and stop bits. General-purpose software that can be used with a number of different systems allows you to set up the protocol. Because it is more flexible, it is more advantageous.

Uploading Capabilities

The process of sending a file stored on disk from your Macintosh is called *uploading*. The file can be a piece of electronic mail, a program, a game, data from a spreadsheet, or whatever. Uploading is one of the most useful features of a communications software package.

Downloading Capabilities

The process of receiving (or capturing) a file from another computer and storing it on your disk is called *downloading*. Some programs allow you to store the file directly onto disk, while other programs first store the information in the Macintosh’s random access memory. Downloading (like uploading) is one of the most useful features of a communications software package.

the character bits is an odd number. Obviously, error checking that checks for parity isn't 100 percent foolproof, but many errors can be detected nonetheless.

If an error is detected by the receiving computer (your Macintosh, for instance), most communications programs will resend that character.

When parity is set to none (sometimes called "0"), error checking does not take place. Most information services ignore parity (set it to "none"). If a service uses mark or space parity, you can usually set your parity to none.

Start or Stop Bits

When a character is being transmitted, a *start bit* is sent from one computer to the other to indicate that the next 7 or 8 bits will be data bits. After the information bits are transmitted, one or two *stop bits* are sent to indicate the end of the character. This is true of every character (byte).

Duplex

Most telecommunications sessions require two-way data transmissions: that is, you must be able to "talk" and "listen" just as you can with a telephone. This capability is called duplex communication. (Radios and TVs only have the capability for simplex, or one-way, communications.)

There are two types of duplex communication: full-duplex and half-duplex. Full-duplex is true two-way communication because your computer screen displays what you are typing as well as what is being typed on the other computer. (Actually, whatever you type is first sent to the other computer and then sent back to your Macintosh and displayed on the screen. So if you are using full-duplex and what you type appears appears on the screen, you know that the connection has been made.) Half-duplex, however, lets you see only what is typed on the other computer (somewhat like a CB radio, on which only one person can speak at once). Most information services require full-duplex.

XON/XOFF

In many cases, information can be sent and received between computers faster than they can actually "digest" it. Consequently, a means of controlling the flow of data is required. This control method is referred to as XON/XOFF (pronounced "X on, X off") or "handshaking."

In most cases, information that comes into your Macintosh is sent to a storage area (called a buffer) in your computer's random access memory. When XON/XOFF is activated, the system knows when the buffer is "filling up" and consequently sends a signal to the other computer that tells it to stop sending data. Your

This section describes the key concepts governing communications software and some of the features you should look for when evaluating which program suits your needs. Finally, this chapter introduces you to Apple's MacTerminal communications program. For a technical description of communication software, see Appendix B.

COMMUNICATIONS PARAMETERS

There are four basic communications parameters: baud rate, word length, parity, and number of start or stop bits. If you are communicating with an information service, you must find out what the service's protocol is and set yours to match it. If you are communicating with another Macintosh user, the two of you can decide what parameter settings you wish to use.

Baud Rate

Baud rate has already been defined as the number of bits per second (bps). Currently, 300 baud is the most common baud rate for personal computers. This simply means that 300 bits per second can travel from one computer to another. This is about 30 characters per second, depending on how many bits are used to define a character (that is, the *word length*, defined below). If your modem can only transmit at 300 baud, you *must* set your software baud rate to 300 baud.

Word Length

In asynchronous communication, word length does not mean the number of characters in a word. Instead, *word length* refers to the number of bits that make up an individual character. Typical word lengths are 7 or 8 bits to a character. If your computer is set up to read 7 bits per character and the other computer sends 8 bits per character, communication will be very unreliable.

Parity

To make sure that information is being sent correctly, a built-in error-checking feature called *parity* is used. You can set parity to *even*, *odd*, *none* (*none* disables parity checking), *mark*, or *space*.

If even parity is used, your Macintosh and the other computer's communications software add up the number of binary 1 bits that are in each character. If the sum is even, it is assumed that no errors have occurred. Of course, if two or four data bits were sent or received, the sum would still be even and the error would not be detected. The same is true for odd parity where the programs check if the sum of

3

MACINTOSH TELECOMMUNICATIONS SOFTWARE

Communications hardware cannot operate on its own. To begin telecommunications, software is also required. The primary function of communications software (often called *terminal software*) is to provide the computer with the instructions that are necessary for *asynchronous communication* to occur. (Asynchronous communication is the basic method of computer-to-computer information exchange. It simply means that one character is transmitted at a time.) Individually, these instructions are referred to as *communications parameters*; together, these parameters are called *communications protocol*.

For two computers to communicate, both computers must be using the same protocol. As long as the protocols match, it doesn't matter what kind of computer your Macintosh "talks" to. It can communicate with a Macintosh down the hall or an information service's multimillion-dollar IBM. You don't even need to use the same communications software as long as your parameter settings are the same.

Many communications programs automatically set protocol for you. This is useful if you are communicating with the same computer on a regular basis; but if you begin communicating with another computer, you may have to change all or one of the parameters.

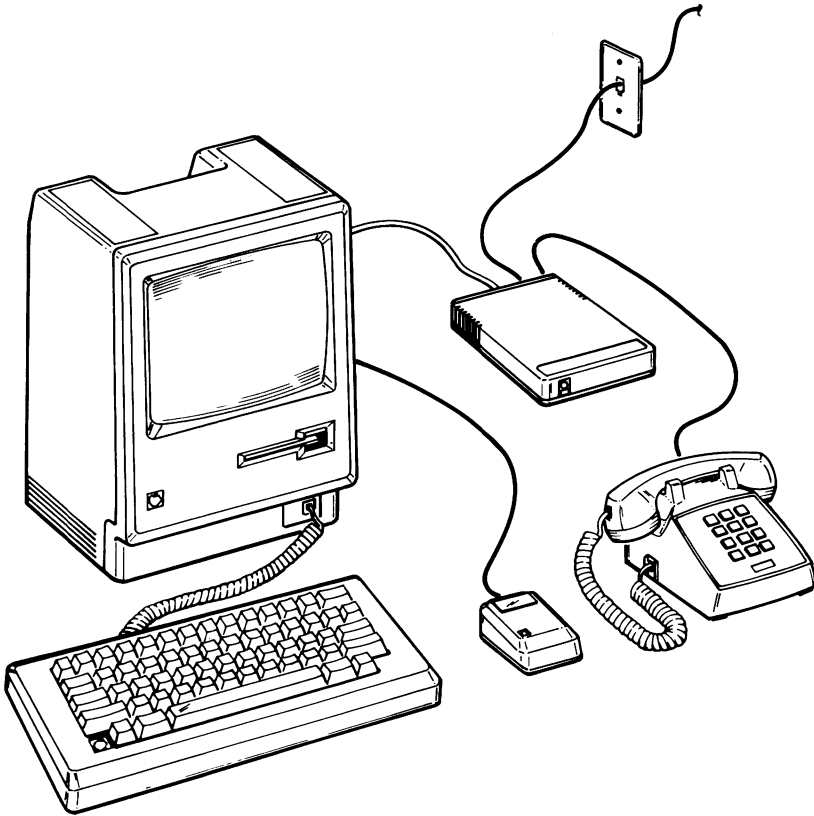


Figure 2-9. *Macintosh telecommunications system setup*

gram, see Chapter 3 for details.) When the terminal screen of your communications program is displayed, type **ATL** and press RETURN. If the modem is connected properly, you will immediately hear a high-pitched tone, the message **CARRIER** will appear on the screen, and the modem's power-on indicator will begin blinking. To end the self-test, simply type +++.

If you are sure that the hardware is operational, you should start becoming familiar with your communications software. The next chapter provides details on one such package — the MacTerminal program.

kits: one kit for the Apple II computers and the other for the Macintosh/Lisa computers. The modems are the same; the difference is that the Macintosh kit has a 9-pin to 9-pin cable (see Figure 2-8) while the Apple II kit has a 9-pin to 25-pin cable (such as the one in Figure 2-3).

Once you have the proper adapter kit, connect one end of the adapter cable (it doesn't matter which end) to the 9-pin connector on the modem. Connect the other end to the Macintosh plug that is below the phone icon:



Next, unplug from the wall the cable that connects your telephone to the wall. Take that end and insert it into the right-hand phone connector on the back of the modem. At this point, insert one end of the telephone cable that came in the box with your modem into the wall phone plug and the other end into the left-most connector on the back of the modem. Finally, insert the small end of the power adapter into the appropriate plug on the back of the modem, and plug the large end into a 120-volt wall-outlet. The entire system should look like Figure 2-9. You can now turn on the power to both the modem and the Macintosh.

You can ensure that system is connected properly by executing the modem self-test before going on-line. To run the Apple modem self-test, you will first need to load your communications program. (If you are using the MacTerminal pro-

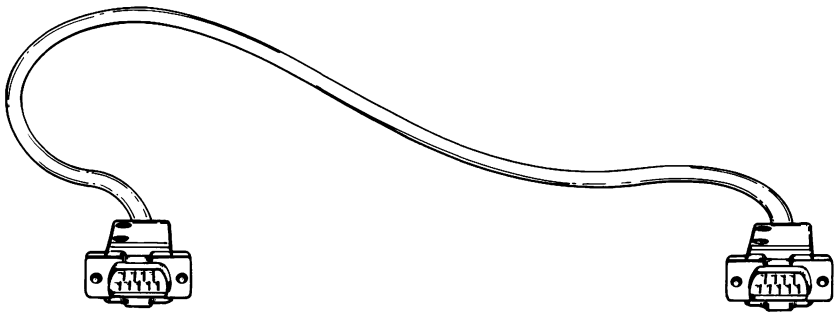


Figure 2-8. *Macintosh-to-Apple modem connecting cable*

control certain modem features (duplex settings, originate or answer mode, and so on). The Apple modems do not. They do, however, have a single set of switches on the back of the modem that is pre-set. For most applications, you should simply confirm the switches are set correctly (switch 1 down, switches 2 and 3 up).

Apple Modem Features

As previously mentioned, the Apple Modem 300 lets you telecommunicate at 300 baud or less, while the Apple Modem 1200 communicates at either 300 or 1200 baud. If you are using an Apple Modem 1200, baud rate selection is controlled by your communications program (such as MacTerminal, which will be described in Chapter 3).

Both Apple modems operate in either full- or half-duplex. (To change the duplex, again load your communications program, enter the program's terminal mode, and type **ATF0** and press RETURN to select full-duplex, or type **ATF1** and press RETURN for half-duplex.)

Both modems also have automatically selected originate and answer modes. Normally, when you turn on the Apple modem, it is in originate mode. Whenever the modem receives a call from another modem, however, it automatically enters answer mode. When the communications session is complete, the modem returns to originate mode.

With both Apple modems, phone numbers can be dialed automatically by the communications program. If you wish to dial another computer manually, load the communications program, enter the program's terminal mode, and type **ATD** (be sure to use uppercase letters), either **P** or **T** (for "pulse" or "tone" phone lines respectively), and finally the phone number. Don't forget to include the prefix 9 to get an outside line if necessary. And if you are calling a long-distance number, be sure to include the number 1 followed by the area code. In some instances, a pause is required between dialing sequences. To insert a pause, use a comma. The following sequence, for instance, will dial a long-distance number using tone dial:

```
ATDT 9,1-415-555-1212
```

The only indicator light the Apple modems have is a power-on indicator on the front of the modem. During data transfers, the light will flicker similar to a carrier detect indicator.

Connecting the Apple Modems

This section will describe how to connect an Apple modem to your Macintosh. Before beginning to set up the system, be sure you have the right adapter kit that includes the appropriate connecting cable. Apple provides two modem adapter

THE APPLE MODEM

Apple provides two versions of what is essentially the same modem—the Apple Modem 300 and the Apple Modem 1200 (see Figure 2-7). Both modems offer many of the features that make a modem useful, and both are designed to be used with your Macintosh. The only functional difference between the two is that the Modem 300 transfers data at 300 baud only, while the Modem 1200 transfers data at either 300 or 1200 baud. However, since the features of both modems are controlled by the computer, you shouldn't notice any operational difference between the two.

Many modems have small switches (called *DIP* switches) that allow you to



Photo courtesy of Apple Computer, Inc.

Figure 2-7. *The Apple Modem 1200*

be “answer.” (Note that enhanced modems like the Apple modems have the capability to set themselves automatically to either answer or originate mode, depending on the other computer.)

Don’t be misled by the terms *originate* and *answer*. “Originate” does not necessarily apply to the person originating the phone call, nor does “answer” to the person answering the call. You can have your modem set to answer and still dial someone else — as long as his or her modem is set to originate.

AUTO-DIAL

To communicate with an information service, you must first dial the phone number of its computer. If you use a basic modem, you dial from the telephone as if you were making a normal phone call. When you hear the other phone answer, you set a modem switch and hang up the phone. If your modem has an *auto-dial* feature, you can connect the modem directly into the phone jack in the wall and not even use a telephone. Enhanced modems like the Apple modems allow you to “dial” the number from the Macintosh keyboard. This is usually preferred. In addition, an auto-dial modem usually lets you store the phone number on a diskette if your communications program supports this feature. The computer can then dial the number for you.

AUTO-ANSWER

In most cases, you won’t need an auto-answer modem unless you are operating a bulletin board. *Auto-answer* simply means that someone else can call your computer, and the modem will answer the phone even if you aren’t there. An auto-answer modem must be supported by your communications program before it is of real use to you.

INDICATOR LIGHTS

Many modems have lights that indicate the current status of the modem. These lights are usually identified by abbreviations: *MR*, Modem Ready, means the modem’s power is on; *CD*, Carrier Detect, indicates that your modem has made contact with another modem; *SD*, Send Data, indicates that your modem is sending information to the other computer; *RD*, Receive Data, means that information is being transmitted to your system; and *OH*, On Hook, lights up when your modem has answered the telephone.

Indicator lights are particularly useful when you are having communication problems. By watching the indicators and understanding what they mean, you can often isolate and solve a problem.

isn't nearly as common, some services communicate at 1200 baud (or about 120 characters per second).

Most low- to medium-priced modems (\$50-\$200) transmit at 300 baud *only*. A minimum of 300 baud is mandatory; 1200 baud is an enhancement—and an expensive one at that. Your choice is mostly a matter of economics: a modem offering both 300 and 1200 baud costs about \$500. However, there are information services that require 1200 baud. If you intend to communicate with such a service, be sure to get an appropriate modem.

Note: In this book, when a modem is referred to as 300 baud only, it means that the modem can communicate at a maximum of 300 baud and not 1200 baud. Most 300-baud modems can communicate from 0 to 300 baud; however, you will probably never have to use a baud rate below 300.

FULL- VERSUS HALF-DUPLEX COMMUNICATION

To be effective, a modem must be capable of two-way communication. That is, you must be able to “talk” and “listen” just as you can with a telephone. This capability is called *duplex* communication. (Radios and TVs only have the capability for *simplex*, or one-way, communication.)

There are two types of duplex communications: *full-duplex* and *half-duplex*. Full-duplex is true two-way communication, because your computer screen displays what you are typing as well as what is being typed on the other computer. (Actually, whatever you type is first sent to the other computer and then sent back to your Macintosh and displayed on the screen. So if you are using full-duplex and what you type appears on the screen, you know that the connection has been made.) Half-duplex, however, lets you see only what is typed on the other computer (which is like a CB radio, in that only one person can speak at once). Since many information services require full-duplex, you should consider this feature mandatory.

ANSWER AND ORIGINATE MODES

A basic modem must have both *originate* and *answer* capabilities. Since a single telephone line is used to send information in two directions, the system must have some way of knowing which signal is coming from which computer. This is controlled by having the two modems use different signaling frequencies. One frequency is identified as the *originate* signal and the other as the *answer* signal.

When you are communicating with an information service like CompuServe, you can assume that the service's modem is always set to answer; therefore, your modem should be set to originate. Remember, one modem must *always* be set to originate and the other to answer. If you are communicating with another Macintosh user down the block, decide in advance who will be “originate” and who will

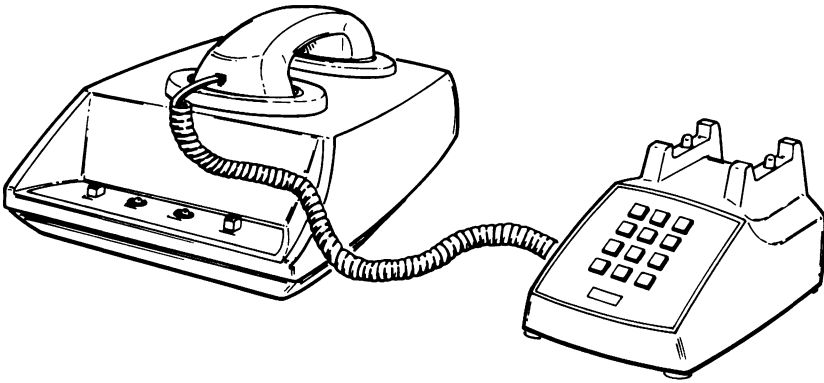


Figure 2-6. *Acoustic coupler*

If you are just getting started with telecommunications, one of the Apple modems is the best to use.

Modem Features

There are many features available on modems. Obviously, you'll pay more for the modem loaded with enhancements than you will for a basic model. For example, both the Apple Modems 300 and 1200 connect directly to the Macintosh, but you'll have to pay more for the 1200 because it has the additional feature of higher data transfer rates.

Some modem features are mandatory; others are simply enhancements. This section will describe some common features; after that, it is up to you to decide which features you need.

300 VERSUS 1200 BAUD

Baud rate is the speed at which data transfer occurs and is measured in *bits per second* (bps). (Remember that a single character is made up of eight bits, or one byte.) The most common telecommunication speed for personal computers is 300 baud (about 30 characters per second). Virtually all of the computerized bulletin boards and information services send and receive data at 300 baud. Although it



Figure 2-5. Typical direct-connect modems

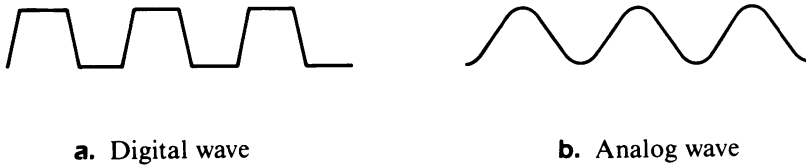


Figure 2-4. *Digital vs. analog wave forms*

computer generates *digital signals*. If you were to see the two signals on an oscilloscope (an electronic measurement device that lets you view electrical signals on a TV-like screen), they would look like those shown in Figure 2-4.

It isn't feasible to send digital information over phone lines or, for that matter, for digital computers like the Macintosh to understand sound waves. Consequently, if you want to connect a computer to a telephone, one or both of the signals must be converted.

The modem's basic role is to convert analog and digital signals. When digital information is sent from the computer to the telephone, the modem simply converts the data to analog signals. This conversion process is called *modulation*. When information is sent from the telephone to the computer, the opposite process, *demodulation*, occurs: the modem converts the analog data to digital information. As you may have noticed, the name *modem* is a contraction of the two terms *MODulation/DEModulation*.

Types of Modems

Generally speaking, there are two types of modems: *direct-connect modems* and *acoustic couplers*. Any type of modem that electronically links a computer to the phone (via direct wires or cables) is a direct-connect modem. The Apple Modems 300 and 1200 are both of the direct-connect type that is linked to the computer by a wire or cable. Figure 2-5 shows other examples of direct-connect modems.

The Macintosh can also use acoustic couplers. These don't require direct connection to the computer. Instead, the telephone headset is inserted into the modem's rubber cups. (See Figure 2-6.)

Direct-connect modems are superior to acoustic couplers for almost every telecomputing application: they are usually easier to use, less expensive, and (most important) more reliable.

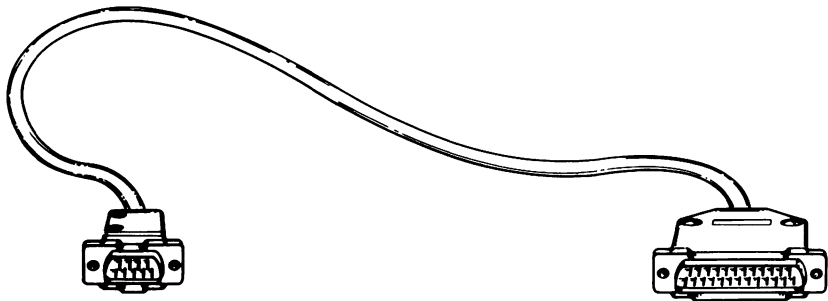


Figure 2-3. RS-422A to RS-232C adapter cable

THE MODEM

Telephones and computers both depend upon electrical power to transmit information. Their similarities end there, however. The signals generated by the two devices differ as much as their physical appearances and internal electronic components. A telephone generates and uses *analog signals* (sound waves), while a

RS-422A	to	RS-232C
1	→	1
2		
3		
4	→	7
5		
6	→	3
7		
8		
9	→	2

Table 2-1. Pin connection for RS-422A to RS-232C adapter cables

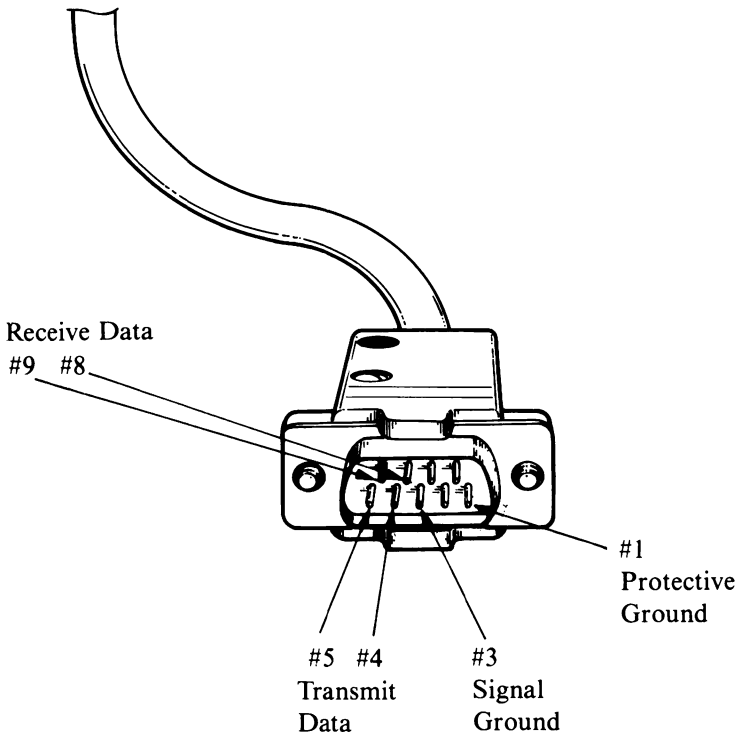


Figure 2-2. RS-422A connector and pin description

Don't think that you have to understand all of the technical details (voltage levels, signal descriptions, and so on) about serial communications and RS-422A to telecommunicate. Understanding the basic premises, however, can help you select the right cable for a serial accessory or troubleshoot your system if problems arise. See Appendix B for a technical description of Macintosh communication hardware.

Remember that even though the Macintosh uses a 9-pin RS-422A interface, it is still compatible with virtually any 25-pin RS-232C serial device (such as a Hayes SmartModem). All you have to do is be sure to have a cable that has a 9-pin connector on one end and a 25-pin connector on the other (see Figure 2-3). If you are building your own cable, you can connect the pins as described in Table 2-1.

Serial Communications and the Macintosh

While most personal computers use the RS-232C standard, some computers do not. The Macintosh is one that does not; instead, it uses another serial communication standard, the RS-422A. In some ways the two standards are alike, and in other ways they are different.

There is little difference, for instance, between the RS-232C and RS-422A voltage level; both standards can interpret voltages between +3 and +12 as a logic 0 and voltages between -3 and -12 as a logic 1.

When you compare an RS-232C and an RS-422A connector plug, however, the most noticeable physical difference between the two standards is apparent. While the RS-232C uses a 25-wire connector, the RS-422A uses only a 9-wire connector plug.

Why did Apple switch from the industry pseudostandard RS-232C to an RS-422A configuration? Primarily because RS-422A overcomes many of the shortcomings of RS-232C without sacrificing compatibility with those interfaces that currently use RS-232C. For instance, RS-232C has two significant restraints: distance and speed. The distance between a computer and a serial device (such as a modem) cannot be greater than 50 feet if RS-232C is used and information cannot be transmitted at baud rates greater than 20,000 baud. RS-422A, on the other hand, overcomes these restraints. A computer like your Macintosh that uses RS-422A can be connected to a serial device that is more than 4000 feet away and can transmit data at nearly 10 million baud.

To accomplish data transfer under these conditions, RS-422A uses a much simpler connection configuration. An RS-422A circuit uses two wires to send data and two more to receive data. This results in a much lower incidence of electrical interference ("noise") than with the RS-232C, which uses a single wire for sending and another for receiving.

The role of each wire (or connector pin) in Apple's RS-422A connector is as follows:

Pin #	Function
1	Ground
2	+5 for output handshake
3	Ground
4	Send data (+, logic 0)
5	Send data (-, logic 1)
6	+12 for detecting power on
7	Handshake
8	Receive data (+, logic 0)
9	Receive data (-, logic 1)

Figure 2-2 illustrates a typical RS-422A 9-pin connector that can be used with a Macintosh.

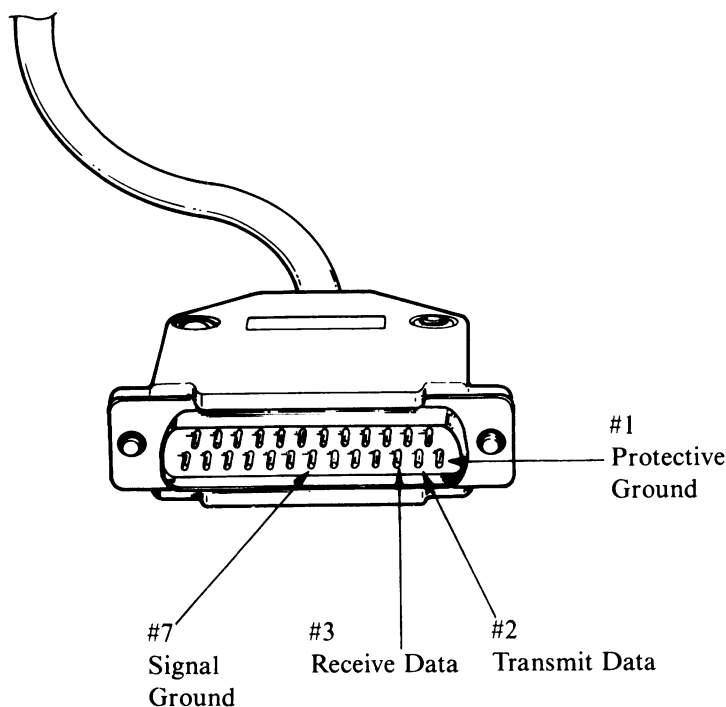


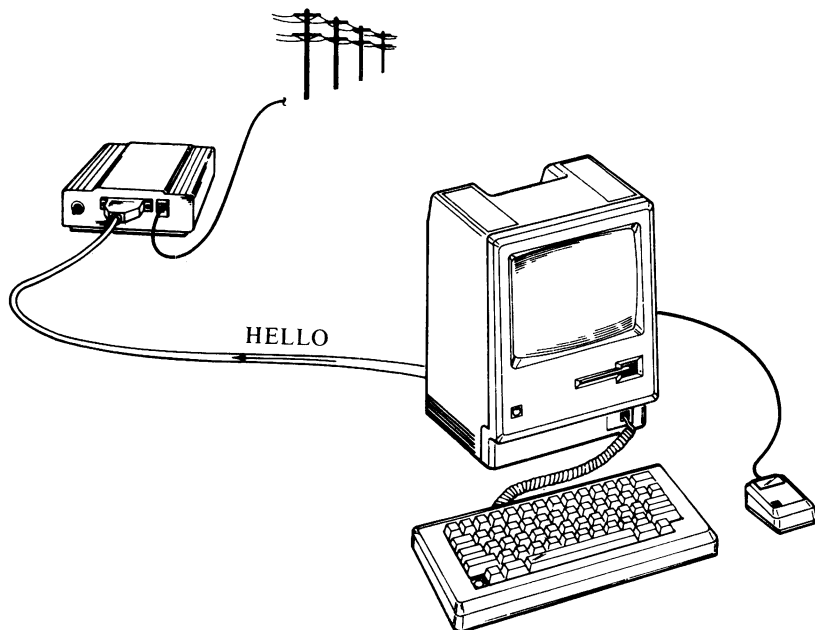
Figure 2-1. RS-232C connector and pin description

A typical RS-232C cable has 25 wires, each of which is designated for a specific purpose. Four wires (or *connector pins*, as they are called) are required for basic communication: Pin #3 receives data from the other computer, pin #2 transmits data to the other computer, pin #1 is the protective ground, and pin #7 is the signal ground. (See Figure 2-1.) If these four pins of the serial connector of a modem are connected to the four pins in the serial connector of a computer, communication can occur. The other 21 pins are sometimes used and sometimes not — it depends on the specific computer application.

In RS-232C serial communications, the computer sends or receives only two types, or voltage levels, of electronic signals: those between +3 and +12 volts and those between -3 and -12 volts. The computer interprets voltage levels between +3 and +12 as 0 and the levels between -3 and -12 as 1. Anything between -3 and +3 is simply ignored.

THE COMPUTER

All information that is telecommunicated by your Macintosh is sent or received in *serial* form. This simply means that each piece of data (such as a letter in a word) enters or leaves the computer in a single row — one character at a time.



Each character (like the letter “H” in the word “Hello” above) is a *byte*, and each byte consists of seven or eight *bits* (short for *binary digit*, which is either a 0 or a 1). While a mathematician may think of a bit as the number 0 or 1, the Macintosh recognizes it as an electrical voltage pulse (or signal) like that which is activated when a switch is turned on. The principle is much the same as with Morse code, but here the signal is much faster and much more flexible. These voltage signals travel over wires from one computer to the other. The combination of the binary data bits 0 and 1 defines the characters being transmitted. The letter A, for instance, is 01000001, while the letter B is 01000010. An electronic computer doesn’t understand 0’s or 1’s, however; it only understands electrical signals.

Most personal computers use a standardized form of serial communications to transmit electrical signals: the *RS-232C* standard. RS-232C refers to two elements in the communication process: the numbering sequence that identifies the wires transmitting the electrical signals, and the voltage levels of the signals themselves. Almost every modem, personal computer, or computing device with serial communication capability uses the RS-232C standard.

2

MACINTOSH TELECOMMUNICATIONS HARDWARE

As the previous chapter pointed out, a telecommunications system consists of two or more computers exchanging information over telephone lines. Each computer in the system must be connected to a modem, which in turn is connected to the phone line. Each computer must also be running a communications program.

It isn't necessary that all of the computers in the system be the same kind. A multimillion-dollar IBM computer, an IBM PC, a Macintosh, an Apple IIc, and any number of other computers can be connected in the same telecommunications system. Nor is it necessary for modems to be the same. If you are using an Apple Modem 1200, for example, you can telecommunicate with someone who is using a Volksmodem or a Hayes SmartModem.

The hardware elements that make up a Macintosh telecommunications system include a Macintosh computer, a modem (such as the Apple Modem 300 or 1200), and a telephone. And while an additional disk drive isn't actually required for communications to take place, one is useful for storing files that are sent or received over the telephone.

stock brokerages like C.D. Anderson and Company, Texas Securities, or the Chemical Bank lets you buy and sell stocks or bonds and open IRAs directly from your Macintosh keyboard. By communicating with the home-banking services of many banks, you can pay your mortgage, utilities, credit-card accounts, department store charges, and other bills. In a few large cities you can even call up a computerized food market, order your groceries over the Macintosh, transfer the money from your bank account to the market's, and have the goods delivered to your home by the end of the day.

The cost of these services varies. In most cases there is a minimum monthly charge (about \$10) for having access to the service; in addition, you may also have to pay for on-line time.

OTHER TELECOMMUNICATIONS APPLICATIONS

Information and services are by no means the only applications for Macintosh telecommunications. Another is *telecommuting*, which allows employees to stay at home and work on a computer instead of commuting to an office. An employee using a computer like the Macintosh can either communicate on-line with an office computer or else perform work off-line (that is, before beginning communication) and then send it all at once over the modem to the office. Telecommuting offers advantages to both the employee and the employer. The employee doesn't have to fight traffic, worry about finding a babysitter, or arrive late for work. Employers, on the other hand, don't have to worry about providing valuable office space or whether or not a worker will show up on time.

Large corporations involved in data entry and information manipulation, including Blue Cross/Blue Shield, Control Data Corporation, and Aetna Insurance Company, have found that telecommuting is an efficient way to get work done. Telecommuting has also proven to be an ideal way of starting up a small business that doesn't require storefront contact with the public: overhead is low, hours are flexible, and the opportunity is great.

As you read this book, you will discover that these applications are only an introduction to what may be the most interesting and practical way you can use your Macintosh. And since information services add new features almost daily, you and the world of Macintosh telecommunications can grow together.

There are certain requirements that must be met before telecommunications can occur. These requirements involve the hardware (the computer and modem), the software (the communications program), and the way in which the two interact. The next two chapters describe both of these elements.

on-line databases. However, you'll want to become familiar with the service's instruction manual before you go on-line, or you may end up spending your money in "wandering" around the maze of the service.

Specialized Information Databases

Many on-line services provide information that is much too specialized for the general public; consequently, these are referred to as *specialized information databases*. An example of a specialized database is WestLaw, a service that furnishes legal citations and information to lawyers. Among the many other specialized databases are Energynet, Pharmaceutical News Index, and World Aluminum Abstracts.

Obviously, databases like these usually don't have information that is of much interest to the layperson. Some even require that subscribers be members of a specialized technical group or organization. (Only members of the American Bar Association can subscribe to WestLaw, for instance.) Because there are fewer subscribers to specialized information services, their access rates are usually much higher than those of general utilities. Some, in fact, charge as much as \$100 per hour.

Library or Encyclopedic Databases

Students and others in need of in-depth research information will find encyclopedic databases highly useful. Databases in this category can be thought of as card catalogs that store an incredible amount of information. Dialog, for instance, contains more than 75 million records in such areas as business, agriculture, medicine, science, and energy. Even considering the millions of entries, however, you can still search through Dialog's catalog much faster than a much smaller card catalog in a regular library. In most instances, these services provide only bibliographic data, citations, and abstracts. When an article interests you, a printed copy can often be mailed to you if it cannot be transmitted electronically.

While many encyclopedic databases are geared for serious research, Dialog and the Bibliographic Retrieval Service (BRS) provide services for the home-computer user at reasonable evening rates. Knowledge Index, for instance, is Dialog's home-computer service, while BRS offers BRS After Dark.

Commercial Services

Banks, department stores, stock brokerages, and other businesses are increasingly making their services available to home-computer users. Instead of distributing information, these businesses usually provide services. Telecommunicating with

4 Mac Telecommunications

local access number (even though the actual computer may be far away).

For the most part, computerized databases provide information and services that fall into one of the following categories: bulletin board systems, general information services, specialized information databases, library or encyclopedic databases, and specialized commercial services.

Bulletin Board Systems

Computerized bulletin boards are an ideal introduction to telecommunicating. Although the information and services they provide is sometimes limited or specialized, the format in which you use them is generally the same. Once you've used one bulletin board, you shouldn't have any trouble using another.

Most local bulletin board systems (BBSs) are operated by computer users groups, computer stores, or individuals who simply enjoy telecommunicating. A computer store, for instance, might provide a classified message board for customers who want to sell or trade used computer equipment and for advertising new products of its own. Sometimes you can even place an order for items and have them mailed to you via the bulletin board. (Chapter 13 lists several bulletin board systems that will let you contact other people who are interested in Macintosh telecommunicating.)

One advantage of local bulletin boards is that they can usually be accessed free of charge, so experimentation is cheap. Most boards request that you limit your on-line time to 20 or 30 minutes per session so that other people can use the system too. Still, it is sometimes hard to find a local bulletin board (check with a local computer users group or store), and when you do find one, the phone line is often busy or a long-distance call is required to access it.

General Information Services

There are two giants in the general information service category: CompuServe and The Source. Both of these databases provide the widest range of information and services available to the general public (hence, they are often referred to as *information utilities*). Once on-line with either service, you can play games, read the newspaper, "talk" with other telecommunications enthusiasts, buy a car, send electronic mail, make airline or hotel reservations, and much, much more.

A general information service typically charges for on-line time the same way the telephone company does. If you call during *prime time* (normal business hours), the rates are higher than if you go on-line during *off hours* (in the evening or on weekends). Prime-time rates can be as high as \$25 per hour, while off-hour usage can be as low as \$5 per hour.

If you are new to telecommunicating, subscribing to a general information service like CompuServe or The Source is a good way to become acquainted with

MAKING THE TELECOMMUNICATIONS CONNECTION

The steps you take to prepare for telecommunication are straightforward and relatively simple. First, connect a modem to your Macintosh; then connect a telephone to the modem. Next, turn on your computer's power and load the communications program. Once the program's opening message is on the screen, set the communication instructions to match those of the computer that you are going to talk to. Finally, dial the phone number of the other computer and begin communicating (or *telecomputing*, as it is sometimes called).

What you do after that depends on the other computer. If you are communicating with a friend down the street, you may begin typing to each other on the keyboard. However, if you are "talking" to an information service, you'll more than likely be required to type in a *password* before you can continue. Obviously, if you don't have a password or if you type an incorrect one, you can't gain "entry" to the information the other computer is storing.

WHAT YOU CAN DO WITH TELECOMMUNICATIONS

Making that initial teleconnection is like opening a door to a new world for your Macintosh. At your fingertips are literally thousands of computerized *databases* (organized collections of information or data) containing an almost unbelievable amount and variety of information and services. Everything from free computer games to highly specialized scientific data is available. (For a description and directory of computerized databases, see *Answers Online: Your Guide to Informational Databases* by Barbara Newlin [Osborne/McGraw-Hill, 1985].)

Generally there are two types of computerized databases: those providing information and those offering services. Some provide both. A typical information-only database might give you the latest stock quotes and nothing more. A service-oriented database, on the other hand, might let you actually buy and sell stocks from your Macintosh keyboard.

Many databases are "free," so accessing the other computer's information or services doesn't cost you anything. Free databases are usually computer-based *bulletin boards* that serve as message or software-exchange centers. In most cases, these systems are set up and monitored by an individual or club. Their phone numbers are rarely toll-free, however, so even though these bulletin boards are free, you'll have to pay for long-distance calls.

The large, commercial databases charge you for their information and services. These charges are usually based on the amount of time you spend *on-line* (that is, the time you are connected to the database's computer) just as the telephone company charges you for long-distance calls. Typically, you don't have to make a long-distance call to access the service's computer since most services provide a

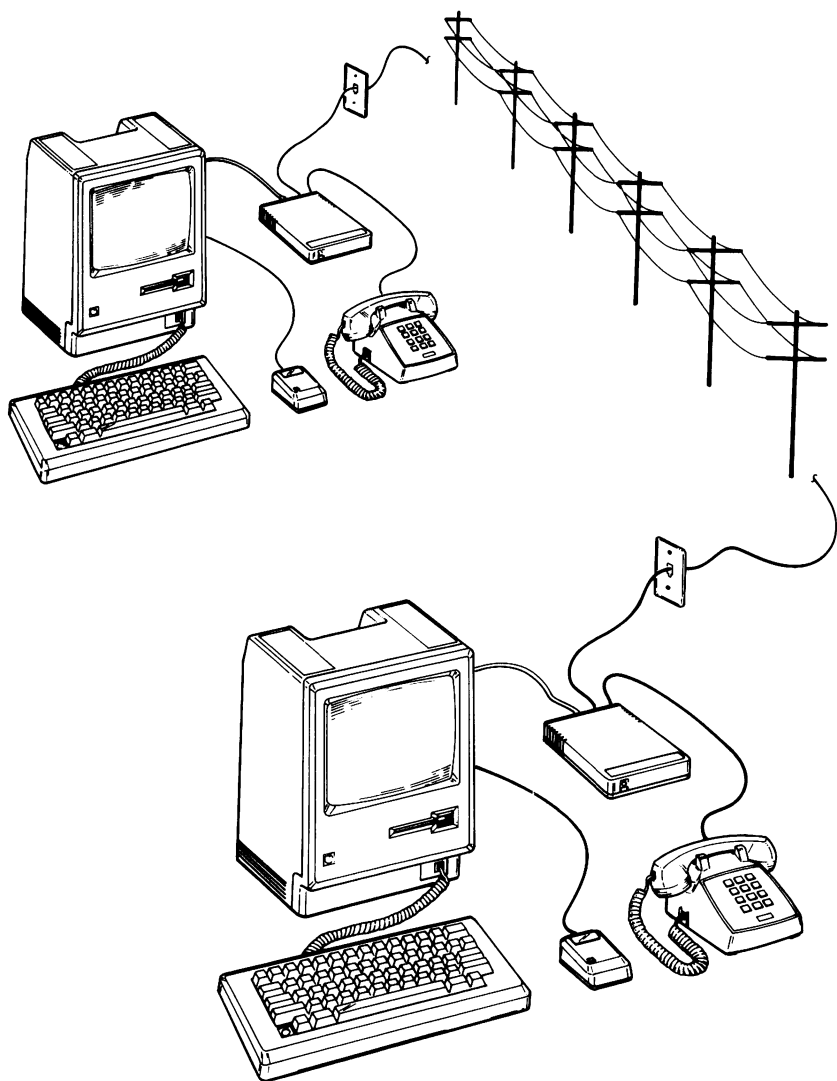


Figure 1-1. *Macintosh telecommunications*

TELECOMMUNICATIONS OVERVIEW

Telecommunications is the exchange of information that occurs when two or more computers are “talking” to each other over telephone lines. The type of computers they are and the distance between them doesn’t matter. Your Macintosh can just as easily communicate with a multimillion-dollar mainframe computer located on the other side of the country as it can with another Macintosh down the block.

When you look at the rear panel of your Macintosh, you see connectors for a mouse, disk drive, printer, and other devices. What you don’t see, however, is a connector for a telephone. That’s because a phone does not directly connect to a Macintosh. Instead you must first connect a *modem* (a device that converts information the computer understands to information the telephone understands) to the computer and then connect a telephone line to the modem. And although you can’t see it, you can be sure that the computer on the other end has a similar setup no matter what type of computer it is. Figure 1-1 illustrates a typical telecommunications system.

In addition to the modem, the only other requirement for Macintosh telecommunications is a *communications program* that contains instructions (such as the speed at which information travels over the telephone line) needed for your Macintosh to communicate with other computers. Chapter 3 describes the features of typical communications programs.

and the MacTerminal communications program. These two products were chosen because they are reliable and they have the most widely used Macintosh communications options.

This book begins with a general introduction to telecommunications: what it is, what you need, and what you can do. Next, *MacTelecommunications* will show you how to get started, including hardware connections and telephone dialing instructions. After that, specific telecommunications applications will be introduced along with step-by-step procedures.

Telecommunications information services and telephone networks described in this book (such as CompuServe, The Source, and others) require specific procedures and display specific prompts and menus. At the time of this book's publication, the screens appear as illustrated. However, the prompts and menus used by a specific service can and do change. Therefore, a screen or procedure may not be the same as described in this book, but don't worry. Just use the service's "help" feature to learn how to use the prompts and menus.

INTRODUCTION

If you are like people everywhere who own and use a Macintosh, you've probably done all of the things people do with their personal computers: made sales projections, written letters, learned how to program. Yet you still may be asking the same question millions of other people are asking: "Yes, but what else can I do with my home computer?" The answer to that question (or at least part of it) can be summed up in one word: *telecommunications*.

What is telecommunications? It is the "talking" between two computers over the telephone lines. Actually, the computers don't talk any more than telephones talk. You do the talking, but instead of speaking into a microphone, you "talk" by typing on the Macintosh keyboard.

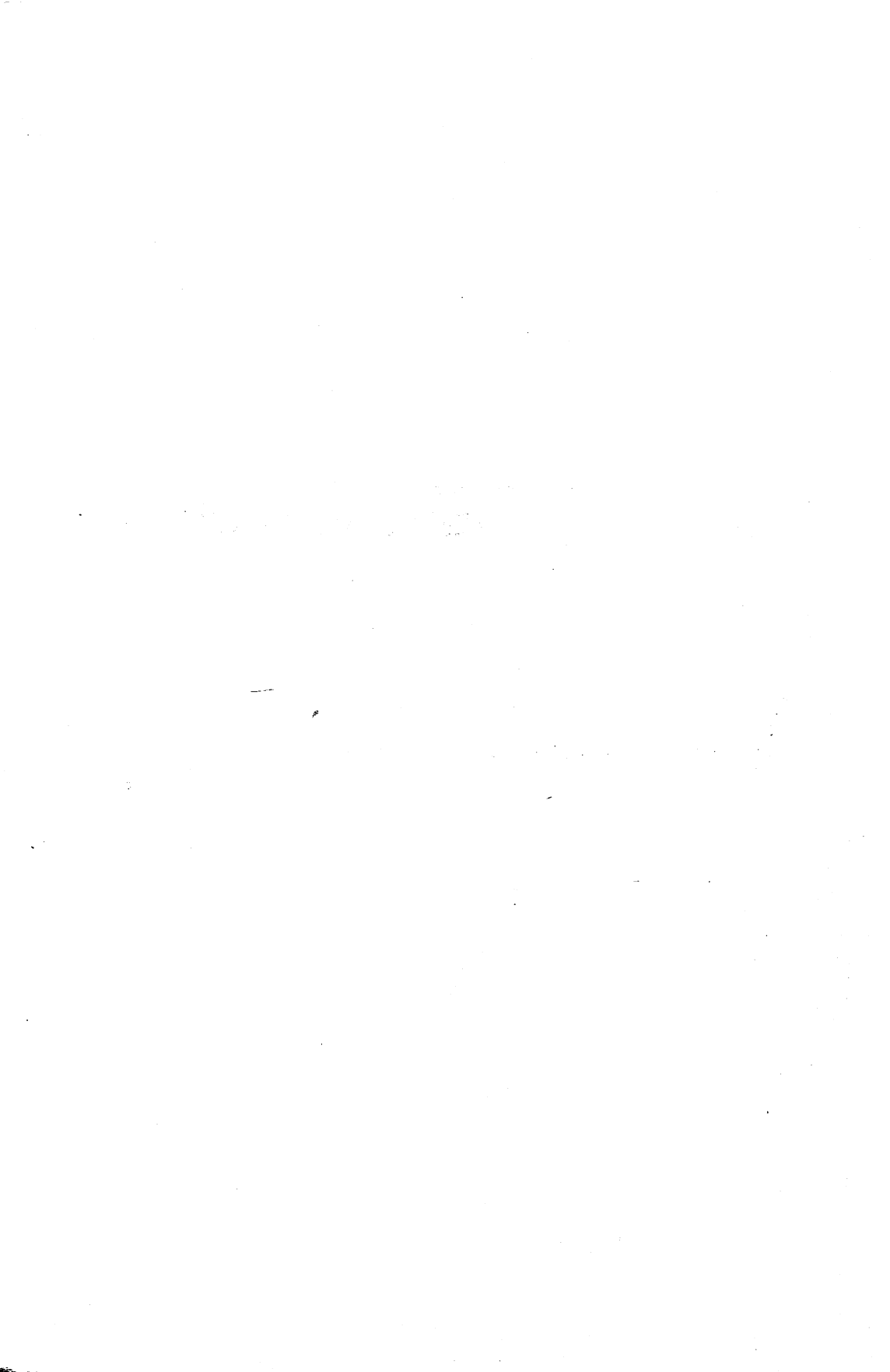
What do computers have to talk about? Well, that's what this book is about. They talk (or more precisely, they let you talk) about everything from sports to the stock market or from programming to politics. But when computers are connected to the telephone, a lot more than just "idle digital chatter" can take place. You can also send mail to an acquaintance, do your Christmas shopping, play a game with someone on the other side of the country, and more.

Before any computer-to-computer communication can take place, however, your Macintosh must be outfitted with certain hardware and software. The primary hardware required is a *modem* that connects the telephone to your computer. A special computer program, called *communications software*, is also needed. *Mac Telecommunications* focuses on the use of the Apple Modem 1200

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J.E.

MacTelecommunications

MacTelecommunications brings the exciting world of telecommunications to you and your Macintosh™!

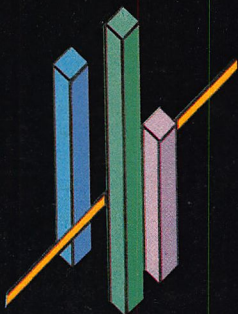
Learn to use your Macintosh to teleconnect with the thousands of existing databases. You'll gain access to an incredible variety of information and services, ranging from free computer games to highly specialized scientific data.

All the popular network and information services are detailed, and you're shown step by step how to use your Macintosh for banking, buying and selling stock, research, and much more.

It's all here: an overview of telecommunications, the hardware you'll need, instructions for MacTerminal™ and other communications software, plus tips for customizing your Macintosh's communication capabilities.

Put the powerful resource of telecomputing at your fingertips, with your Macintosh and **MacTelecommunications!**

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